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AUTOMOTIVE AND TRACTOR INDUSTRY

DEVELOPMENT OF MOTOR TRANSPORT REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 41, Oct 79 p 2

[Article: "Motor Transport"]

[Text] By improving transport quality and speeding the carrying of shipments and passengers, the motor transport workers are taking an active part in accomplishing the tasks of the country's economic and social development. In the first three years of the five-year plan, cargo turnaround in national-economic motor transport increased to 296 billion ton-kilometers, or more than 17 percent above the 1975 level, as shown in the chart. Meanwhile, turnaround in general-purpose motor transport increased by 19.5 percent. Transport services to the public have improved significantly. In 1978 buses carried more than 40 billion passengers, 10.7 percent more than in 1975.

The industrial base for motor transport was strengthened through reconstruction of existing motor vehicle plants and construction of new ones. As a result, the total carrying capacity of trucks produced last year was 620,000 higher than in 1975. For comparison we may note that for the entire Ninth Five-Year Plan this increase was 653,000 tons. Motor transport enterprises are now receiving larger numbers of specialized trucks: dump trucks, vans and tank trucks of various types. The breakdown of the vehicle inventory is changing steadily. In recent years the design, durability and economy of the vehicles, and as a result their operating characteristics, have improved markedly. For example, the ZIL association has increased the life of ZIL-130 trucks from 150,000 to 340,000-350,000 kilometers.

One of the major areas of scientific and technical progress in motor transport is the development of containerized and stacked [paletnyy] shipments, making possible complete mechanization of loading and unloading operations. In the first three years of the five-year plan, general-purpose vehicles carried more than 101 million tons of cargo in containers. The quantity of stacked shipments exceeded 80 million tons, with more than half accounted for by brick and small-piece wall materials.

But the rate of growth of these progressive shipping methods in motor transport is still insufficient.

Improvement of transport service to the public has been aided by expansion of the bus fleet: during the first three years of the five-year plan the number of buses increased by almost 14 percent. The bus route network is expanding.

In 1978, 2,596 new routes were opened, including 153 intercity routes. Currently more than 13,000 urban routes and 21,300 intercity routes are in operation, with a total length of more than 3 million kilometers. Almost 6 million passengers are carried every day on these lines.

The motor transport workers are currently competing for successful fulfillment of the stepped-up assignments of the fourth year of the five-year plan. In order to improve the quality of services to all sectors of the economy, the annual freight turnaround of national-economic motor transport must be increased to 420 billion ton-kilometers, 24 percent over the 1975 level. Freight turnaround for general-purpose motor transport must amount to 125 million ton-kilometers, 30 percent above the 1975 level.

It is planned to increase bus passenger turnaround to 376 billion passenger-kilometers in 1979, 23.8 percent higher than in 1975. In the first eight months of this year, the general-purpose motor transport freight turnaround was 6 percent above the same period last year. But plan fulfillment was only 99 percent. Bus passenger turnaround was up by 4 percent, and the plan for passenger transport was slightly exceeded.

A good example in the struggle for more efficient utilization of the vehicle inventory and better-quality operation is being set by thousands of motor transport enterprises in all the union republics. Mass socialist competition during the Tenth Five-Year Plan has been enriched by new and valuable initiatives. Cooperation between "interfaces" of different types of transport has become smoother, leading to a decrease in inefficient hauls, less idle time for rail cars, trucks and ships, and lower transport expenditures in the national economy.

New Developments in the Transport Competition

A progressive form of operation by motor vehicle, marine, railroad and river transport has been developed and expanded in Leningrad's transport system: it involves coordinated, continuous schedules on the basis of a unified process. As a result of this, in a single year the productivity of motor vehicles has increased by 23 percent and idle time has been decreased by two-fifths. The quantity of cargo handled by the direct ship-truck variant has increased by 13 percent. Currently work in 22 seaports has been organized according to the experience of the associated enterprises of the Leningrad transport system with the approval of the CPSU Central Committee.

The practice of the comprehensive intersectorial competition of transport enterprises in Gor'govskaya, Novosibirskaya, Saratovskaya, Chelyabinskaya and a number of other oblasts merits attention. But there are serious shortcomings in the organization of intersectorial competition. The operations leadership of several motor transport administrations, in particular in Pskov, Ryazan', Kalinin and Vladimir, are slow in incorporating the experience of pacesetters. Frequently cooperation agreements have an incoherent, piecemeal character. They lack mutual commitments on the fulfillment of haulage assignments in the transport systems.

Currently the motor transport workers are actively aiding kolkhoz and sovkhoz workers in bringing in the new harvest and hauling vegetables, grain and other agricultural products. On the fields and farm roads of the RSFSR alone as many as 600,000 trucks are in operation. But hauling of the harvest, particularly of beets, is not proceeding satisfactorily everywhere.

The productivity of the general-use motor vehicle inventory has increased since the beginning of the five-year plan. But there is still immense latent potential which has not yet been brought into play. This is attested to by the table below, which provides data on the use of trucks by the union republic ministries of motor transport and by the country as a whole during the first half of 1979:

| Ministry of Motor Transport | Vehicle On-Line Coefficient | Total Days' Work | Total Days Not Worked |
|-----------------------------|-----------------------------|------------------|-----------------------|
| RSFSR | 0.63 | 114.0 | 67.0 |
| Ukraine | 0.68 | 123.4 | 57.6 |
| Belorussia | 0.66 | 119.8 | 61.2 |
| Uzbekistan | 0.69 | 125.2 | 55.8 |
| Kazakhstan | 0.57 | 103.6 | 77.4 |
| Georgia | 0.70 | 127.9 | 53.1 |
| Azerbaijan | 0.68 | 115.4 | 65.6 |
| Lithuania | 0.58 | 105.4 | 75.6 |
| Moldavia | 0.58 | 105.4 | 75.6 |
| Latvia | 0.60 | 109.0 | 72.0 |
| Kirgizia | 0.62 | 112.6 | 68.4 |
| Tadzhikistan | 0.61 | 110.8 | 70.2 |
| Armenia | 0.62 | 112.6 | 68.4 |
| Turkmenia | 0.63 | 115.4 | 65.6 |
| Estonia | 0.59 | 107.2 | 73.8 |
| USSR Overall | 0.63 | 114.6 | 66.4 |

As can be seen from the table, in the first half year, most general-use trucks worked 115 out of 181 calendar days on average for the country as a whole, which is completely unsatisfactory.

Trucks in good working condition had considerable idle time. In many republic motor transport ministries it amounted to 45-48 calendar days. Decreasing idle time for trucks in working condition constitutes an immense latent potential for further increasing efficient use of the inventory.

The on-line coefficient for buses was 0.73 for the country as a whole during the first half year. The indicator was largest in Latvia (0.81) and lowest in Tadzhikistan (0.66). In the RSFSR it was 0.74. Bus idle time in repair, waiting for repair and in working order was 27 percent for general-purpose transport and 25 percent for buses in working condition.

The Brigade Form of Labor Organization

Effective use of the motor vehicle inventory requires better organization of driver work, and especially more extensive organization of the collective brigade form. This will improve the utilization of motor vehicles in terms of days of the week and times of day. The best form of labor organization is change-over of the brigade to work on the basis of contractual agreements based on internal cost accounting according to the example of USSR State Prize winner E. P. Fedyunin, brigade leader of Motor Combine No 29 of Glavmosavtotrans [Main Administration of Motor Transport, Moscow Gorispolkom]. This issue of EKONOMICHESKAYA GAZETA describes in detail how the brigade contract method is being disseminated in Moscow's motor vehicle operations.

But this progressive form of labor organization for drivers is still being introduced only slowly and incompletely. Last year about 11.5 percent of brigades in the nation's truck transport system were on the brigade contract. While in Estonia 32 percent of drivers were working by this system, in Latvia 23 percent and in Belorussia 21.6 percent, the figures for Armenia and Tadzhikistan were only 1.5-3.5 percent. The situation is no better in Amurskaya, Astrakhanskaya, Belgorodskaya, Irkutskaya and Kalininskaya oblasts in the RSFSR.

Introduction of the brigade contract is being hindered by the lack of a unified procedure and organization of the transport process and the low level of mechanization of loading and unloading work. To date no scientific recommendations for a changeover to cost accounting by the motor transport brigades have been developed.

An immense source of latent potential is the further development of centralized haulage by general-purpose motor transport. During the Ninth Five-Year Plan, the percentage in the RSFSR Ministry of Motor Transport increased to 82.5 percent for all haulage. Good results in centralizing haulage of commercial and food-stuff shipments were achieved in Volgogradskaya, Ivanovskaya and Novosibirskaya oblasts and in the city of Sochi. A system of planning and management of the hauling of construction, commercial and agricultural shipments and fuels and lubricants is in existence in Kazan'.

At the same time, there are unused capabilities in organized and centralized haulage. Inadequate attention is being given to their development in the Checheno-Ingushskaya ASSR and in Kirovskaya, Lipetskaya and Orenburgskaya oblasts. In Kemerovskaya oblast there are 18 enterprises of Gossnab USSR, of which only three are centrally served by the Kemerovo transport administration. Many large shipment-creating facilities lack dispatcher guidance of motor transport. Accordingly, everything possible must be done to improve centralized haulage, which is an effective method of improving the utilization of motor vehicles and decreasing transport expenditures in the national economy.

Intercity haulage is also being developed. Its development is still being hindered by the fact that the inventory is receiving inadequate quantities of large-capacity vehicles. The motor vehicle industry is producing only small quantities

of trailers for tractor-trailer units. The sorely-needed dumping tractor-trailer units based on the ZIL, KamAZ, MAZ and KrAZ, as well as semi trailers for hauling liquid fuel, milk, flour and other commodities, are being produced in extremely limited quantities. An increase in the inventory of trailers, together with improved utilization of them, is the more important because they are an important factor in efficient use of fuel. Motor transport has great potential for saving gasoline and diesel fuel.

Truck Haulage of Shipments in the National Economy (billions of tons)

| 1975 | 1976 | 1977 | 1978 | 1979 (expected) |
|------|------|------|------|-----------------|
| 20.9 | 21.6 | 22.2 | 23.1 | 24 |

Tasks in Improving Economic Work

Increased hauling efficiency is being helped by planning of shipments along efficient routes, by time schedules and by selection of optimal variants in assigning consumers to suppliers. These tasks are being successfully accomplished with the help of mathematical economics methods and computers. In the Tatar transport administration almost a third of shipments are now planned by computer. The motor vehicle use coefficient has been increased by 9 percent and idle time for loading and unloading has been decreased by 14 percent, while the average shipping distance has been decreased by 8 percent. The total economic effect exceeds half a million rubles. Extensive use is being made of mathematical economics and computers in the planning of motor transport work in Glavmosavtotrans, Glavlenavtotrans [Main Administration of Motor Transport, Leningrad Gorispolkom] and a number of other organizations.

Unfortunately, the percentage of shipments made by efficient routes is still low. The cluster computer centers of the republic ministries of motor transport are not taking a sufficiently active role in this undertaking.

Motor transport associations are the basic level in the organizational structure for management of both general-purpose and departmental motor transport. This makes possible responsive maneuver of trucks, improvement of their utilization by routing of shipments, and decreased empty trips.

The process of concentrating the motor vehicle inventory by creating associations and large motor transport enterprises must be accelerated. The country still has a large number of small-sized motor transport operations. Currently two-thirds of the operations have from 1 to 9 trucks. More than half of trucks are still in motor transport enterprises with fewer than 50 trucks.

The main condition for eliminating small, unprofitable operations is the transfer, on the basis of economic advantageousness, of motor vehicles owned by ministries and departments to general-purpose transport. The problem of changing the procedure for financing capital investment in the construction of garages and for acquisition of trucks has become acute. The effectiveness of eliminating small

motor transport operations is convincingly confirmed by the experience of Shchelkovskiy Rayon in Moscow Oblast. There a large general-purpose motor transport association has been created.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Increasing the Influence of the Economic Mechanism on Improvement of Production Efficiency and Work Quality" calls for the development on this basis of a complex of measures to sharply increase the level of organization of work and the national-economic effectiveness of operation by all types of transport. A system of indicators capable of improving servicing of the country's national economy by motor transport must be designated. Work in this direction has begun for motor transport, but it must be carried out in the specified time.

Increase in Passenger Turnaround in General-Use Transport (billion passenger-kilometers)

| 1975 | 1976 | 1977 | 1978 | 1979 (expected) |
|-------|-------|-------|------|-----------------|
| 303.6 | 325.3 | 344.5 | 36.5 | 376 |

Cargo Turnaround for National-Economic Motor Transport (billion-ton-kilometers)

| 1975 | 1976 | 1977 | 1978 | 1979 (expected) |
|------|------|------|------|-----------------|
| 338 | 355 | 373 | 396 | 420 |

8480

CSO: 1821

AUTOMOTIVE AND TRACTOR INDUSTRY

MAGNETO CRAFT--CAR WITHOUT WHEELS INVENTED

Moscow SOVIET MILITARY REVIEW in English No 9, Sep 79 p 38

[Text] The tests of a passenger car having no wheels and provided with a magnetic suspension have been successfully carried out in the USSR. The invention (Magnetocraft) is intended for a high-speed passenger way now under construction in the city of Alma-Ata.

The magnetoCraft is capable of moving with a speed of more than 100 km/h and powered by a linear electric motor which moves along the metal reactive strip by means of the "running" electromagnetic wave. The absence of wheels and rotating parts in the motor makes it entirely noiseless.

This advantage is not the least, however. At high speeds the railroad car wheel becomes unreliable, tends to skid and vibrate. With the linear motor there are none of these disadvantages. Combined with the magnetic suspension, it is opening the road to high-speed transportation near the earth's surface.

Specialists assert that the construction costs of the "magnetic" roads are three times less than those of the underground railway. They will be built on bridges whose piers may be installed on the dividing line of the streets and avenues; in some cases they will be built in tunnels.

Are magnets dangerous for human beings? Scientists have carefully worked on the problem, performed accurate measurements and guarantee complete harmlessness of magnetocraft transportation.

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CSO: 1827

CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

EXPANSION OF BANK CREDIT IN CONSTRUCTION FINANCE SUCCEEDING

Moscow PRAVDA in Russian 20 Oct 79 p 2

[Article by M. Zotov, chairman of the Board of Directors of USSR Stroybank: "Bank Credit — Improving the Mechanism of Economic Management"]

[Text] Capital construction occupies a leading place in the country's industrial complex. Continued economic growth and improvement in the well-being of the Soviet people depend largely on it. The decree of the CPSU Central Committee and USSR Council of Ministers entitled "Improving the Planning and Bolstering the Impact of the Economic Mechanism on Raising the Efficiency of Production and Quality of Work" gave this sector a great deal of attention. We must, above all, work out steps to speed up the introduction of capacities and reduce the number of new projects being started and the amount of incomplete production. A gradual transition is envisioned to building enterprises through credit from USSR Stroybank. All these measures are expected to promote growth in the efficiency of capital investment.

What kind of credit is this? To explain it simply, the collective takes a monetary loan from the state and repays it within a definite time with interest. The construction workers are paid after the project is completely built and turned over to the purchaser. If they do not meet their timetable they bear significant material losses. Conversely, turning the projects over on time or ahead of schedule strengthens the financial position of the collective, enlarging its bonus fund.

Here are some figures that illustrate the great importance of credit in the national economy. In the last 10 years the total sum of short-term loans has risen almost 60 percent, reaching 220 billion rubles at the beginning of this year. Credit has become the most important source of formation of working capital.

In the current phase of development of our economy plans call for a further increase in the role of credit, stepping up the rate of turnover of capital, and increasing the share of loans in the financial support of capital investment. By the beginning of the 11th Five-Year Plan

a system of charges between customers and builders for completely finished and turned-over enterprises and start-up complexes is to be introduced. It seems to me that it would be wise to switch half of the construction organizations to this form of payments beginning in 1980. This system of payment is fundamentally important. Customers will stop giving advances, to be transferred to direct bank credit, to contracting organizations for incomplete production.

Experiments show what this approach will do. Experiments are underway in construction organizations in Belorussia, Lithuania, and elsewhere. Experience has demonstrated the high efficiency of direct bank credit and the use of charges for completely finished projects. Thus, in Belorussia in recent years more than 1,600 enterprises and shops and a great deal of housing have been put into use. The average annual growth rate of commodity construction output has been more than 10 percent. It exceeds the growth rate in volume of construction and installation work. The length of construction work at projects has been cut by 14 percent.

The transition to this progressive payment procedure raises the problem of forming credit resources. When issuing loans the bank will use capital of the purchasers that has been released after the transition to settling accounts without intermediate payments. The abolition of advances and introduction of direct bank credit is an important phase in the continued advance of the principles of the socialist financial system. It eliminates the significant problem of receiving money before services are rendered. It also removes obstacles to broad application of economic accountability. After all, construction workers have often accumulated significant capital regardless of the volume of work done.

Direct bank credit to construction organizations promotes stronger financial plan discipline and more complete fulfillment of established assignments for timely introduction of capacities and objects. Abolition of the system of advances radically changes the structure of formation of working capital. Whereas today loans constitute about 18 percent, with the transition to direct bank credit they will be about the same as in industry, up to 50 percent.

It is envisioned that the norm to cover expenditures related to incomplete production will be set at about 10 percent of the annual work volume. This standard will be maintained by the capital that the construction organizations possess. If their resources are inadequate, there will be an opportunity to use bank credit.

Settlement of accounts between purchasers and planning-surveying collectives will now be done for completely finished and accepted documents. The expenditures of these collectives before the scheduled time for turning over the plans will be covered from their own working capital and bank credit. The financial source of the credit should be the money which the purchasers will accumulate with transition to settlement of accounts without intermediate payments. Therefore, another important

area in improving the economic mechanism is the use of bank credit by this important participant in construction, the planning organization.

But how will the purchasers form their working capital? They can use credit to pay for domestically produced industrial and power equipment for production facilities before the scheduled time of turning it over for installation. Settlement of accounts between contractors and purchasers for projects turned over "under key" is an important step. Experiments have shown how much this increases the efficiency of capital investment: 19 of 27 capacities introduced were turned over on time or ahead of schedule. The savings achieved compared to the estimated cost at 10 enterprises was about 1 million rubles. The amount saved was reflected in the profit of the contracting organizations and created additional stimuli to reduce the cost of construction.

Improving credit relations between banks and construction customers is an important line of activity in improving the economic mechanism. Until recently, of course, things went slowly in this area. Many managers preferred to use budget appropriations or to receive money from their ministries. They did not like to go to the bank for loans because they would be strictly accountable for timely payment. Now enterprises and ministries are increasingly using credit as a source to finance capital investment. Thus, the issuance of long-term credit by USSR Stroybank in the first three years of the 10th Five-Year Plan was more than 2.5 times greater than the same period of the Ninth Five-Year Plan.

With improvement in the mechanism of profit distribution it became necessary, given a shortage of organizations' own capital to finance capital investment, to stipulate more active use of bank credit in the five-year plans of ministries, associations, and enterprises. After all, everyone knows that a major shortcoming of the system now in operation is that continuity of financing is not always guaranteed. Collectives that have exhausted their annual limit and are overfulfilling plans cannot find additional resources. Therefore, it was decided to finance construction projects discontinuously, on the basis of planned project lists within the limits of the ratified estimate. Where the plan is overfulfilled objects will be financed through credit. The establishment of a single fund for the development of science and technology will also help strengthen the financial systems of ministries, associations, and enterprises. The capital in this fund will provide a source to finance scientific research and experimental design work, incorporate new types of output and industrial processes, and improve product quality. Banks have been given the right to grant loans to ministries and departments for these purposes. These loans will be given for periods of up to two years.

Thus, credit relations are being implemented on a broad scale in the economic activities of all the participants in construction. This will promote a rise in the efficiency of capital investment and return on capital. Experience shows convincingly that granting credit for

expenditures increases the economic accountability interest of collectives in timely, high-quality performance of jobs and better use of material and financial resources.

The effectiveness of credit depends greatly on the interest rates charged for it. The interest rates are low, but when the planned credit period runs out the rates go up significantly. This will be reflected immediately in the amount of profit which an enterprise receives for its own purposes.

Now, when the party and government have outlined clear-cut ways to improve the economic mechanism, the problem of strengthening planned discipline and speeding up payments becomes especially critical. Penalties without mutual charges should be used to increase the material accountability of suppliers for compliance with contract obligations. And for timely payment for output delivered in conformity with contracts, banks have been authorized to give loans for periods of up to 60 days. These loans will be repaid with five percent interest. If the money is not repaid on time the rate of interest goes up. It is important that economic managers not rely entirely on bank credit. The possibility of receiving bank credit does not relieve either suppliers or customers of the responsibility for timely payment of amounts due. On the other hand, increasing their mutual interest in timely clearance of account should promote more efficient use of credit and expenditure of profit. If not, the profit may go to pay increased interest charges.

The expansion of credit relations demands an improvement in all economic work. The audit of construction organizations recently made by USSR Stroybank showed that monetary problems were a large part of the explanation for failure to fulfill crucial plan assignments. Construction finance plans were not developed and plans and schedules of work were not written up at the right time. Needless to say, such omissions are intolerable under the new conditions of economic activity.

The problems of raising the efficiency of construction demand an increase in the organizational and technical level of production and an improvement in the management of the economic and financial activities of subordinate organizations by all administrative bodies. Economic services must be made more responsible for consistent performance of plan assignments.

11,176
CSO:1821

CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

DECREE OUTLINES NEW METHODS OF CONSTRUCTION FINANCE, MANAGEMENT

Pravze SOVETSKAYA KIRGIZIYA in Russian 18 Sep 79 p 2

[Article by S. Korchubekov, candidate of economic sciences, chief of the division of capital investment and construction of the Institute of Economics of the Kirgiz SSR Gosplan: "The Impact of Capital Investment — It Must Be Greater"]

[Text] The CPSU Central Committee decree on further improvement of the economic mechanism and the jobs of party and state bodies and the decree of the CPSU Central Committee and USSR Council of Ministers entitled "Improving the Planning and Bolstering the Impact of the Economic Mechanism on Raising the Efficiency of Production and Quality of Work" have set forth a broad program of steps to accelerate the introduction of production capacities and raise the efficiency of capital investments. These decrees call on construction workers to attain good final results.

The article below tells about new methods of economic management and the urgent challenges which must be met to step up the pace and improve the quality of capital construction.

The above-mentioned decrees devote special attention to improving the economic mechanism in capital construction. This is natural. Growth in the country's economic might and improvement in the well-being of the Soviet people depend significantly on the pace, quality, and efficiency of capital construction. In turn, the scale and pace of construction depend on the volume and efficiency of capital investment.

The concern of the party and government for the development of this sector can be seen clearly in the example of our republic. During the years of Soviet power more than 600 industrial enterprises have been built in Kirgizia. The process of building new enterprises and

modernizing existing ones has been particularly intensive in recent years. Suffice it to say that during the Eighth and Ninth Five-Year Plans capital investment in development of the republic economy was 1.6 times as much as in the preceding 40 years. Significant capital was also allocated for the purpose in the 10th Five-Year Plan. Unfortunately, we do not always get a proper return from the expenditures.

The plan for introduction of production capacities, housing, and social and cultural-domestic facilities in the republic was 89 percent fulfilled in 1976, 86 percent in 1977, and 84 percent in 1978.

Of the enterprises launched in operation many were turned over to customers late; construction time on a significant number of projects exceeded norms. For example, the Tokmak Worsted Goods and Spinning Factory took roughly five years to build instead of the planned two and a half, and the tobacco fermentation plant in Tash Kumyr took 30 months instead of 20. At the same time, the volume of incomplete construction is increasing every year. By the end of 1978 it constituted 521 million rubles, 8.1 percent more than the figure in 1976 and substantially above established norms.

Such a significant amount of incomplete construction leads to very tangible economic losses. Furthermore, the delay in completion of construction frequently results in a situation where fixed capital is obsolete even before it is put into operation.

What is the reason for these troubles in construction? Is it lack of discipline on the part of the builders? Is it their lack of initiative or ineptitude? Needless to say, these factors do affect the construction of many projects. But they are not the whole story. To a significant degree the inefficiency of capital investment arises from weaknesses in the planning of and material incentive for construction work. The decree of the CPSU Central Committee of USSR Council of Ministers on questions of economic activity aims at the elimination of precisely these shortcomings. The state planning committees, ministries, and departments of the USSR and the Union republics face a great deal of work in this area.

The decree assigns an important place to long-range planning. Experience demonstrated long ago that one cannot get by with guidelines for only one year. A stop must also be put to cases of changing and altering plans which, ultimately, almost always have resulted in a lowering of the efficiency of capital investment. Beginning with the 11th Five-Year Plan the basic document guiding construction workers must be a firm plan for the entire period broken down by years and balanced with resources of materials, equipment, and finances and matched to the capacities of the construction organizations. This plan will be based on an itemized list, a stable document for the entire five-year period of construction that is mandatory for purchases, planning and financial bodies, and the suppliers of equipment and construction parts.

Instead of the former total volume of capital investment, purchasers will now have a ceiling on state capital investment and on construction-installation work and a stable plan for the five years that is not subject to revision in the yearly plan. It may be asked: what is the difference? The difference is significant. The total volume of capital investment was an estimated figure. But a ceiling is an index of resources that tells the maximum amount of capital investment for the planned introduction of finished enterprises, capacities, and facilities and planned progress on other work. It does not impel organizations to "incorporate" all allocated capital at any price; on the contrary, it obligates the purchaser to watch every ruble and prevent any increase over the initial estimated cost of the project, something that has happened very frequently in recent years.

The ceiling is expected to do one more important thing. It forces organizations to give priority in the use of capital investment and all other types of resources to modernizing and technical reequipping of existing production. Capital for building new enterprises and expanding existing ones will be allocated only where the economy's need for a particular type of finished products cannot be satisfied by intensifying the use of existing capacities.

This emphasis on increasing the share of expenditures for modernization and technical reequipping of existing enterprises within the total volume of capital investment is not accidental. Both calculations and experience show that this significantly reduces expenditures per unit of growth in productive capacity, cuts construction time to one-half or one-third, limits the area being built up, and increases the concentration of production.

The new approach puts many obligations on the purchasers. They are expected to be especially responsible when including in the plan new projects and enterprises to be modernized and expanded. These measures must be properly substantiated. Specifically, the drafts of the five-year plans must have attached plan balances and calculations of the use of existing production capacities and fixed capital and summary plans of modernization and technical reequipping of existing enterprises with calculations of the capital investment and equipment needed to carry them out. There must be a showing of how each ruble of capital investment influences raising the technical level of production, and not just growth in capacities.

The approach to evaluating the activity of construction organizations is changing significantly. The basic index will be introduction of capacities and facilities into operation, as well as the volume of market output, that is, the value of construction and installation work done at priority start-up complexes and projects turned over to the purchaser and fully ready to produce output.

This gives construction workers new stimuli. The index of incorporation of capital investment that used to operate encouraged them, as

well as the purchasers, to spend money as quickly as possible. The pursuit of "gross volume" inspired them to use excellent materials and construction parts wastefully and to take a real interest only in the "profitable" stages of construction. With this purpose in mind contractors tried to get more new projects, but were in no hurry to complete them.

The transition to payments between purchasers and contractors for completely finished production capacities and facilities that have been turned over for use, not for stages of work performed as was formerly the case, will be an important stimulus to perform assignments on time. The expenditures of construction organizations will be covered by bank credit. This also will inspire construction workers to turn finished projects over as quickly as possible. After all, one pays interest on credit and the principal must be paid back. This makes it necessary to substantiate carefully the wisdom of expenditures and to insure that they are efficient.

Smooth construction work demands planned and comprehensive supply of necessary materials, design elements, and equipment. Reconciliation of plans with material resources at the level of each association and enterprise will be accomplished on the basis of five-year economic contracts between enterprises that produce output and construction organizations.

Improving the organizational structure of construction management is also important. The basic economically accountable unit should be the construction production association, or in certain cases the trust, giving special attention to raising the level of production concentration and the degree of specialization and strengthening cooperative ties among all participants in the construction process.

Thus, the system of measures to raise the efficiency of capital investment that has been developed encompasses the entire construction industry complex and aims to improve all stages of the construction cycle, from planning to the introduction of facilities and capacities into operation, and to improve all elements of the economic mechanism, from planning to organizational forms of construction management.

Implementation of the principles of the decree of the CPSU Central Committee and USSR Council of Ministers is scheduled for the beginning of the 11th Five-Year Plan. However, preparations for the transition to the new methods should be started without delay.

Already today, when shaping programs for the last year of the five-year plan, purchasers, contractors, and planning bodies must reduce the number of construction projects included in them. They must also take steps to reduce the amount of incomplete production. To achieve this the plans must envision completing projects that are most advanced first of all and limiting the construction of new facilities in order to concentrate effort at projects already begun and thus accelerate work at them.

It is equally important to begin work toward improving the management of capital construction. The republic today has more than 300 contracting construction-installation and construction repair organizations which are subordinate to 35 ministries and departments. Even such small cities as Talas, Dzhalal-Abad, and Rybach'ye and rayons such as Sokulukskiy, Chuyskiy, and Alamedinskiy, have 13-26 such organizations apiece, often doing less than 1 million rubles of work. The existence of such small construction organizations cannot be justified; it is a case of scattering labor and material resources. Elimination of these organizations and concentration of the work in the hands of consolidated, well-equipped subdivisions means to put a significant reserve for raising labor productivity and more efficient use of machinery into effect. The production of industrial design elements, parts, and articles, especially reinforced concrete ones, also needs reorganization. This production today is scattered at small organizations belonging to different departments and is frequently done by backward methods. The products are expensive and the quality is not outstanding. Concentrating such production facilities and reequipping them is one more important reserve for raising the efficiency of construction.

The decree on improving the economic mechanism offers broad opportunities to improve the activity of all participants in the construction process. Realization of all these measures in practice will increase the return on each ruble of capital investment and guarantee a further upswing in the Soviet economy.

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CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

SERIOUS SHORTCOMINGS IN CONSTRUCTION IN TADZHIKISTAN EYED

Dushanbe KOMMUNIST TADZHIKISTANA in Russian 24 Aug 79 p 2

[Article by M. Ikramov, chief engineer, republic office of USSR Stroybank: "Why Did the Cost of the Plant Go Up? - Improving the Economic Mechanism"]

[Text] The volume of capital investment in our country increases year after year. At the same time, we must admit that some ministries, departments, and local governmental agencies do not always use capital investment in a wise, economical manner. There are numerous cases where the entire increase in capital investment is eaten up by projects begun earlier whose costs have risen, so no money is left for new planned projects. Furthermore, construction drags out for many years at large projects.

The large volume of incomplete construction leads to irreplaceable losses of material resources not just in construction but also in other sectors of the economy. If all construction projects begun were completed on time, in addition to the basic planned output we would receive, the republic would also gain a certain profit. But when construction drags out everything is just the opposite. Instead of profit large amounts of money are frozen and the republic fails to receive millions of rubles worth of output. Plans and calculations of profit break down and the advancement of capital construction itself is retarded. In addition to protracted periods of construction we still have to consider the lengthy period of incorporation of capacities, which has become traditional, as well as the time spent to prepare planning and estimate papers. When an enterprise begins working at full capacity, it is often technically out of date.

Experience shows that the rise in construction cost is directly dependent on the amount of time spent beyond the limit for building the objects. When construction drags out the initial estimate may, for a number of reasons, become outdated itself and the construction workers will not be able to stay within expenditure figures. Therefore, the estimates have to be revised and additional capital is allocated to complete the job.

Let us look at cases. Construction began on the reinforcement plant in Dushanbe in 1966. Work continues today. The above-plan cost of the project has already passed 2 million rubles. Construction costs have risen similarly at other projects. The motor vehicle terminal in Dushanbe, for example, took four years to build instead of two, and construction on the printing combine lasted 10 years instead of four.

The republic office of USSR Stroybank recently made an analysis of the causes of increase in the estimated cost of capital construction. The volume of capital investment increases significantly each year in all the ministries, departments, and local Soviets. However, this additional influx of money is not always put to use. In some cases there is a certain scarcity of capital designated for capital investments, rather than an increase, because it has been eaten up by the increased estimated costs of building facilities begun earlier.

In the first three years and six months of the current five-year plan at construction sites financed by the republic office, planning and estimate documents have been revised and ratified again at 91 sites. Estimated costs rose in every case.

In analyzing the causes of increase in the estimated cost of construction projects one constantly runs into cases where the estimate limit initially ratified is not the final cost of construction. Experience shows that where construction is well organized, contracting and planning organizations work in a coordinated way, and relations between purchaser and contractor are on a business-like level, timetables for turning projects over for launching are met or at least closely approached.

Hundreds of large and small construction projects are underway in the republic at one time. This situation is beyond the capacities of our construction and installation organizations. Capital investment continues to be scattered, which is a serious obstacle to timely completion of projects because it is impossible to allocate sufficient materials, monetary, and labor resources for each site. The scattering of capital usually occurs at the insistence of the executives of ministries, departments, and local Soviets. This practice results in large economic losses. Therefore, it is very important to strive for balanced plans. The capacities of construction and installation organizations should be considered more accurately ahead of time and work volumes determined in conformity with this.

The rise in the cost of capital construction sometimes begins in the very first stage: planning. Mistakes and omissions by planners in the republic alone, together with unskilled execution of planning and estimate documents, have increased the cost of capital construction 8.7 million rubles since the beginning of the five-year plan. The current system of economic stimulation has played a negative part here too because it does not provide incentive to reduce the projected cost of construction. It is closer to the opposite. Planners have an

interest in higher estimated costs for a project because their wages fund and the size of bonuses depend directly on this.

The statute on capital construction provides that projects costing up to 3 million rubles can be ratified in the local area without the consent of USSR bodies. Certain ministry and department executives take advantage of this circumstance. They independently ratify planning and estimate papers, by passing all expert examinations and not reconciling the plan with the contractor. Here they have, so to speak, a free hand. They can artificially lower the estimated cost or divide one project into several parts and then pass each one off as a self-sufficient project. Sometimes they artificially understate the cost of equipment or conceal, until the "right time," plans to finish the exterior and interior of buildings with expensive materials and panels.

There are many other ways to lower the initial estimated cost so that it will not reach the three million ruble mark. After the initial cost has been spent the project is temporarily halted or even shut down. Planning and estimate papers are revised and ratified again. However, new papers are not the same thing as money. Higher-ranking bodies begin receiving requests for money, with arguments for the importance of the project and accusations against "wasteful" construction workers for everything. Time passes and construction drags out artificially, while the initial cost of the object increases 1.5-2 times. The cost of the airport in Kulyab, for example, rose from 2.9 to 4.5 million rubles and the cost of the Gazoapparat Plant in Leninabad increased from 2.8 to 4.7 million.

The additional financing of capital investment is done by the state, so the organizations and their executives who are trying to get their own requests included in the plan do not bear material or other accountability for their soundness. Over a period of many years they have completely mastered this technique and are absolutely confident that the money will be allocated, if only one goes after it with enough persistence. In a large majority of the cases the managers get their way, particularly because this capital is given to them outright and permanently. It ultimately turns out that, pressured by many energetic managers, the planning bodies come to a very simple solution: give everybody a little bit. They do this and everybody builds "a little bit."

There are serious problems in the credit and finance mechanism. For example, purchasers are in no hurry to get loans at the bank. They are not advantageous because they must be repaid. Even if they find that they cannot get by without a loan, it is not repaid with the enterprise's own capital; it is repaid by interdepartmental transfer of money from one project to another.

The policy of efficiency and work quality, therefore, demands a radical alteration of the mechanism of the economic management, including capital construction. The decree of the CPSU Central Committee and USSR

Council of Ministers entitled "Improving the Planning and Bolstering the Impact of the Economic Mechanism on Raising the Efficiency of Production and Quality of Work" envisions the introduction in 1981 of payments between purchasers and contractors being made for enterprises, start-up complexes, phases, and objects that are completely built and turned over for operation.

When the transition to the new method of payments is made purchasers will stop giving contracting organizations advances for expenditures against incomplete construction. Before the scheduled turnover of the object these costs will be covered by bank credit. The banks will make use of the purchasers' money liberated as the result of the transition to settling accounts with contractors without intermediate payment.

This form of mutual relations will moderate the desire of executives, purchasers, and construction workers to increase the number of new projects. There will be a significant increase in the role of economic levers in the planning and organization of construction and in the mutual relations of purchasers, contractors, and planning-design organizations.

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CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

UDC 728. 1. 011. 28: 699. 84 (575. 1)

CONSTRUCTION IN SEISMIC ZONES OF UZBEKISTAN

Tashkent STROITEL'STVO I ARKHITEKTURA UZBEKİSTANA in Russian No 6, Jun 79
pp 14-17

[Article by L. Ye. Khodak, engineer (TashZNIIEP): "Optimum Construction Parameters for Monolithic Buildings in Seismic Zones of Uzbekistan"]

[Text] The parameters of a building's structural diagram exert a definite influence on the formation of the seismic load and stress of the structural elements and, consequently, on the outlay of basic building materials and cost indicators. Therefore, in designing structures to be built in the seismic zones of Uzbekistan the selection of optimum parameters of structural diagrams is especially important. It is necessary to select those parameters of the structural diagram which will ensure the minimum of expenditures in the erection and operation of buildings.

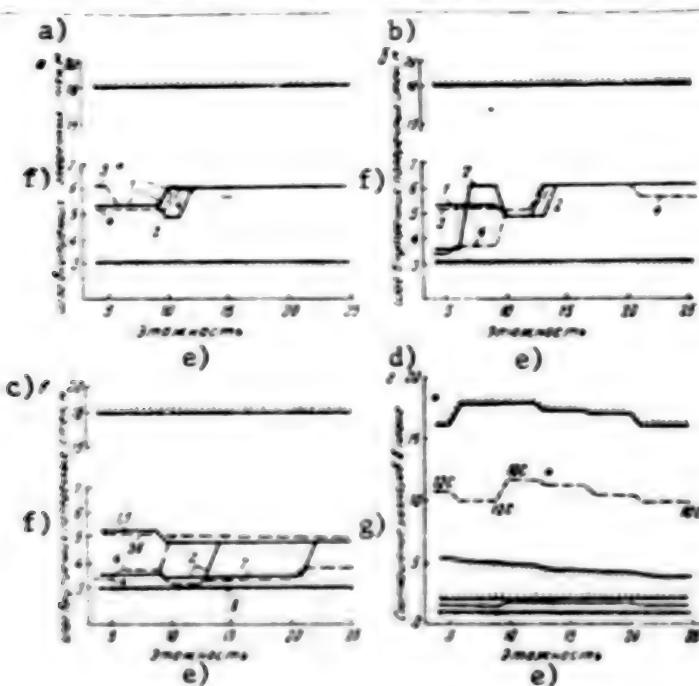
Analysis of workable plans and preliminary scientific drafts have established that in order to estimate the stress and the cost of erecting buildings, the planning diagram (model) may be replaced by an equivalent regular diagram, which is subject to analysis in a broad range of changes in its parameters. This method was implemented in working out an algorithm for determining the optimum parameters of the structural diagrams of monolithic buildings, using cost criteria [1]. The algorithm provides for the automation of the entire planning process, including such phases as the formation of an equivalent planning diagram (model), representing the building's rectangular plan with one interior longitudinal and a varied number of transverse walls, situated at a constant spacing, static and dynamic calculations, structuring, and a determination of the estimated cost and the cited outlays by the national economy. The task boils down to determining those parameters of the building's structural diagram (number of stories, spacing of the walls, relationships of the dimensions in the plan) and the methods of erection which, with the initial data (the set of the apartments and the seismic nature of the construction zones), would guarantee the minimum of the cited outlays, including the estimated cost, reckoning in the development of the territory, capital

investments to the holdings of the construction organizations and adjunct branches of production, as well as operating expenses. The cited outlays per square meter of the building's total area are determined by using the method of the technical-economic estimate of the structural solutions for monolithic frameless buildings, as developed by TsNIIEPzhilishcha [2,3].

Considered here were single-section and sectional apartment houses made of monolithic concrete, designed to withstand earthquakes of 6--9 points [on the Richter scale] and ranging in height from 4 to 25 stories, which can be erected using sliding and volumetrically adjustable forms. The width of the building, proceeding from the planning requirements, alternates within the limits of 8--16 m, while its length falls with an interval of 15--150 m. The maximum length of the building has been limited by the set dimensions of the fire breaks. The spacing of the bearing interior transverse walls varies from 3 m to half the length of the building's temperature section. With the exclusion of a portion of the interior bearing transverse walls, provisions have been made to install a corresponding number of partitions. The total area of a section ranges in the single-section apartment houses from 144 to 394 sq. m, while in the sectional houses it varies from 72 to 192 sq. m. The section areas adopted are conditioned by the guarantee of the normative ventilation requirements for Climate Zone IV, and they correspond to a set of apartments having from 1 to 5 rooms.

As a result of calculations it was revealed that in 7--8 point seismic zones in erecting buildings of up to 9 stories high and using volumetrically adjustable forms a narrow spacing of the interior bearing walls is best, equal to 3.3--3.6 m (Fig. 1). Moreover, in a 7-point zone a narrow spacing is best in single-section buildings ranging in height up to 13 stories, while in a 9-point zone a wide spacing is best regardless of the number of stories. In non-seismic zones a decrease in the spacing of the transverse walls increases the building's bearing capacity. The expenditure of metal in the walls and roofs is reduced, but the expenditure of concrete is increased. The combination of all factors, with consideration being given to capital investments in production funds leads us to the conclusion that in erecting by the method of volumetrically adjustable forms it is best to have buildings with narrow spacing of the bearing transverse walls.

Figure 1. Optimum spacing of bearing, interior, transverse walls in apartment houses made of monolithic concrete:



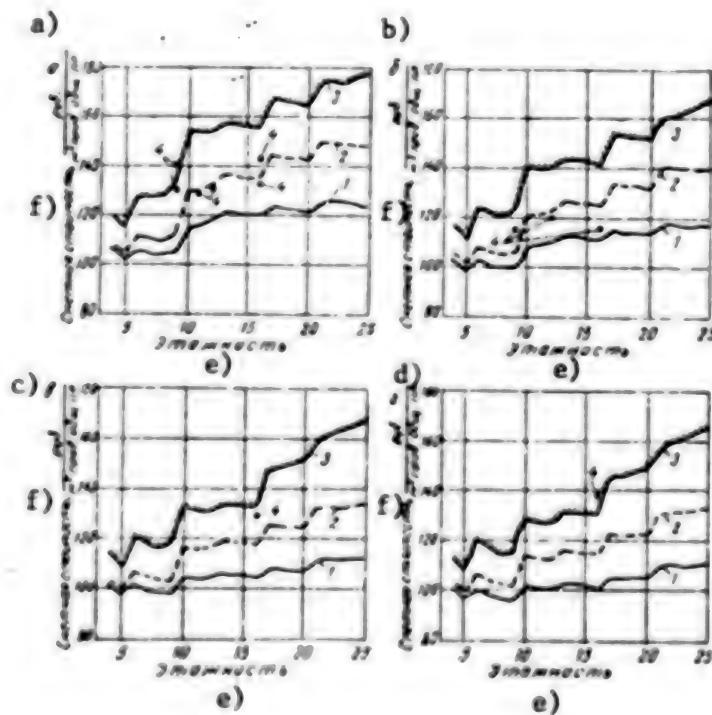
Key:

- a--in a 9-point seismic zone;
- b--in an 8-point seismic zone;
- c--in a 7-point and non-seismic zones;
- d--optimum ratio of building dimensions in floor plan. (---single-section apartment houses; -----multiple-section apartment houses).
- e--number of stories
- f--spacing of the interior transverse walls
- g--relationship of dimensions in the plan
- 1--3--erected using sliding forms; 2--3--using volumetrically adjustable forms; 5--6--using sliding forms in a non-seismic zone; 7--8--the same, using volumetrically adjustable forms.

In seismic zones with an increase in the number of interior walls, along with an increase in the bearing capacity there is an increase in the rigidity and weight of the building, and hence in the seismic load as well. An increase in the seismic load is also observed with an increase in the number of stories. Strains from seismic activity grow more rapidly than the bearing capacity, and this brings about an increase in the expenditure of metal in the walls. Thus, the optimum spacing for bearing transverse walls changes depending on the building's seismic design and number of stories. In erecting with sliding forms there is a sharp increase in the outlays for installing and disassembling the wall forms. The optimum spacing of interior bearing transverse walls increases depending on the number of stories up to 4.8--6 m.

In a practical sense the optimum spacing of interior bearing transverse walls does not depend on the size of the total area of a section. The optimum relationship of the dimensions of buildings in the plan does not depend on the seismicity of the construction zone and the method of construction. At a height of more than 5 stories single-section apartment houses are more economical than sectional ones (Fig. 1, d). Among sectional apartment houses, buildings with the greatest possible extension are the best. For the given total area of a section the greatest possible width of a building is best.

Figure 2. Variation in the estimated cost of 1 sq. m of the cited total area of apartment houses made of monolithic concrete, depending on the number of the building's stories:



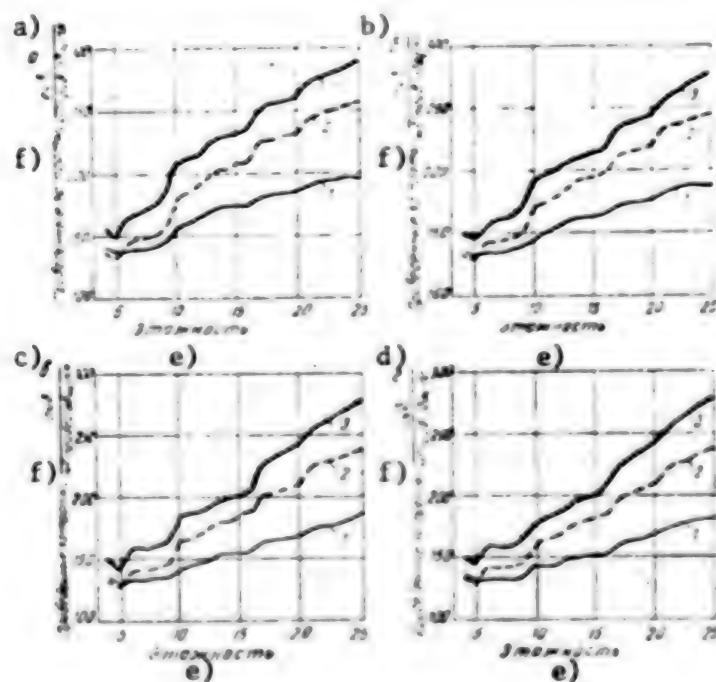
Key:

- a--in a 9-point seismic zone;
- b--in an 8-point seismic zone;
- c--in a 7-point seismic zone;
- d--in a non-seismic zone;
- e--number of stories
- f--estimated cost (rubles/m² cited living space)

1--single section apartment houses; 2--multiple-section apartment houses; 3--buildings with non-optimum parameters; 4--planned and constructed buildings.

In order to appraise the reliability of the results obtained, Fig. 2 shows the change in the calculated estimated cost of apartment houses made of monolithic concrete with optimum parameters, as well as citing the dimensions for the estimated cost of single-section buildings which have been designed for an 8-point seismic zone by the UzNIPgradostroitel'stva (Fig. 2, b). It is obvious from the drawing that the qualitative nature of the change in the estimated cost of the projected buildings with an increase in the number of stories coincides with the nature of the change in the calculated estimated cost, obtained on the basis of the proposed algorithm. Quantitatively the indicators of the calculated estimate cost are lower than the cost determined by means of working designs. Thus, the values obtained for the calculated estimated cost of apartment houses made of monolithic concrete and the results of selecting optimum structural parameters may be considered reliable.

Figure 3. Variation in the proportionate, cited, national economic outlays for the construction of apartment houses made of monolithic concrete, depending on the building's number of stories:



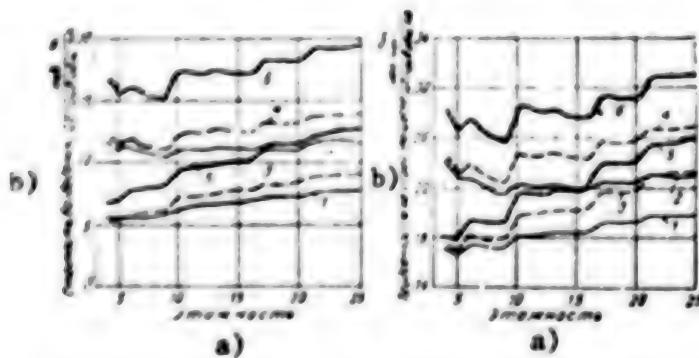
Key:

- a--in a 9-point seismic zone;
- b--in an 8-point seismic zone;
- c--in a 7-point seismic zone;
- d--in a non-seismic zone;
- e--number of stories
- f--cited outlays (rubles/ m^2 of cited living space)
- 1--single section apartment houses; 2--multiple-section apartment houses; 3--buildings with non-optimum parameters.

The cited national economic outlays for erecting buildings made of monolithic concrete with optimum parameters of structural diagrams and ranging in height from 4 to 25 stories are shown in Fig. 3. Buildings of 5 stories have the minimum of national economic outlays. When the number of stories is increased from 5 to 25, the cited national economic outlays in a 9-point seismic zone increase for single-section and sectional apartment houses by 46.9 and 90.6 percent respectively, in an 8-point zone--by 44 and 86 percent, and in a 7-point zone--by 40 and 82.5 percent. Accounting for the requirements of through ventilation leads to the conclusion that single-section apartment houses have indicators of the cited national economic outlays which are lower than the sectional ones for the same number of stories. At various building heights this difference ranges from 8 to 25 percent. The difference in the costs of the optimum as compared with the non-optimum variants increases with the increase in the number of stories from 10 percent for 5-story to 30 percent for 25-story apartment houses. Sectional apartment houses with a number of sections less than 4 and with a great amount of interior transverse walls are non-optimum within the area being considered of allowable values of variable parameters.

The cited data have to do with the buildings being erected by means of sliding forms. Outlays on the construction of buildings by means of volumetrically adjustable forms are 3--8 percent lower (Fig. 4). Moreover, the difference in the outlays is reduced as the number of stories is increased.

Figure 4. Variation in the cost and labor consumption in erecting 1 sq. m of the cited, total area of apartment houses made of monolithic concrete in a 9-point seismic zone, depending on the building's number of stories:



Key:

a--number of stories

b--labor consumption (rubles/m² if cited living space)

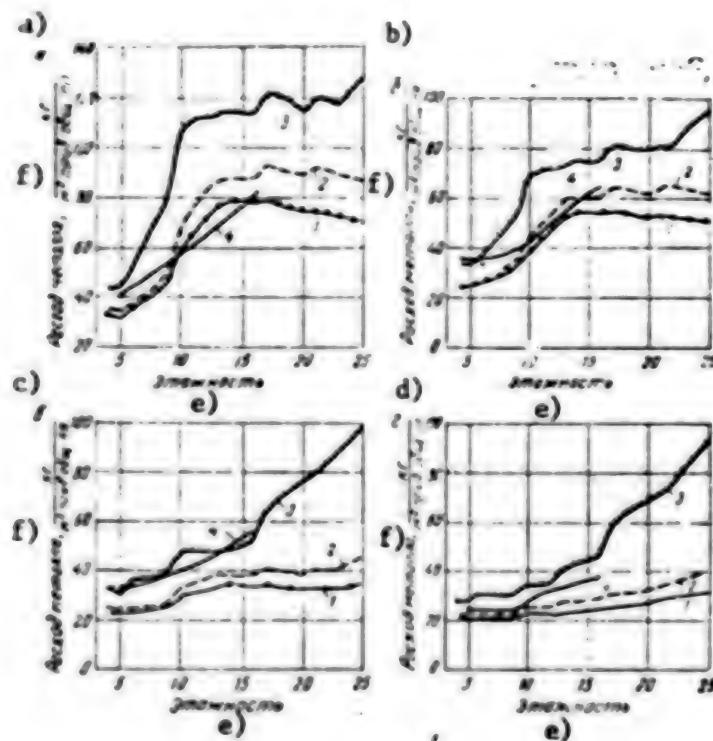
1--2--single-section apartment houses erected using volumetrically adjustable and sliding forms, respectively; 3--4--the same, with multiple-section apartment houses; 5--6--the same, the buildings with non-optimum parameters.

As the number of stories increases, there is an increase in the proportionate capital investments in the fixed capital and working capital of the construction organizations as well as in the allied branches engaged in producing structural components, semimanufactures, and very important materials. The proportionate capital investments in single-section apartment houses are lower than they are in sectional ones, and this difference increases with an increase in the number of stories up to 15 percent in 25-story buildings. The difference in proportionate capital investments in optimum and non-optimum variants increases with the increase in the number of stories from 15 percent for 5-story buildings and as much as 35--45 percent for 25-story buildings.

Operating expenditures are minimal in 5-story buildings. Single-section apartment houses have indicators of operating outlays, as calculated per sq. m of the cited total area, which are lower than the sectional ones. As the number of stories increases, there is an increased difference in the proportionate operating expenditures for the optimum and non-optimum variants, reaching 35 percent in 25-story buildings.

As the number of stories increases, there is an increase in the proportionate outlay of monolithic concrete in erecting the building's bearing components; this is caused by an increase in the thickness of the bearing interior walls, by the installation of elevators, by an increase in their number or load-lifting capacity. Single-section apartment houses, regardless of construction zone and erection method, have lower indicators for the proportionate outlay of monolithic concrete than sectional ones. The difference in the proportionate outlay of monolithic concrete in buildings with optimum and non-optimum parameters also increase with an increase in the number of stories: for 5-story buildings it amounts to 15--30 percent, while for 25-story buildings it ranges from 40 to 45 percent.

Figure 5. Variation in the proportionate metal outlay in apartment houses made of monolithic concrete with an increase in the number of the building's stories:



Key:

- a--in a 9-point seismic zone;
- b--in an 8-point seismic zone;
- c--in a 7-point seismic zone
- d--in a non-seismic zone;
- e--number of stories
- f--metal outlay (kg/m^2 of cited living space)

1--single-section apartment houses; 2--multiple-section apartment houses; 3--buildings with non-optimum parameters; 4--control indicators for steel outlay in apartment houses made of monolithic concrete.

Because of the increase of strains in the bearing structural components, as the number of stories in buildings increases, there is an increase in the outlay of metal, as calculated per sq. m of cited total area. Moreover, this is observed in buildings of as many as 13-15 stories, but then with a further increase in the number of stories this indicator decreases somewhat (Fig. 5). Such a change in the outlay of metal is linked with the spectrum curve of the dynamic coefficient B. Up to a height of 13-15 stories for monolithic buildings $B = 3$, and the increase in the

outlay of steel in this section is linked with the increase in the building's height. In the section from 16 to 23--25 stories the magnitude of the dynamic coefficient decreases more intensively than the height of the building increases. Thus, B decreases by a factor of 3.75, while the height increases only by a factor of 1.7. In connection with this, the strains, and consequently the outlay of metal, decreases. With a further increase in the number of stories the strains would increase due to the increased building height at a constant minimum value of B.

As the number of stories increases, there is at the same time an increase in the effect of the wind load, especially in a 7-point seismic zone, where it is frequently determinative. The indicators of proportionate metal outlay in a 7-point seismic zone and in a region with ordinary construction conditions in buildings with a height of 20 or more stories are almost equal (Fig. 5, c and d).

The outlay of metal per square meter of the cited total area in single-section apartment houses is lower than in the sectional ones, and this difference increases as the number of stories increases. If in 5-story buildings it amounts to 4--6 percent, in the section from 20--25 stories it increases to 18--20 percent. The metal outlay in buildings with optimum parameters of structural diagrams in 9- and 8-point seismic zones is 25--45 percent lower than in non-optimum variants. In 7-point and non-seismic zones this indicator reaches 65 percent. Thus, the optimization of structural diagrams with respect to cost has permitted optimum solutions to be attained with regard to metal consumption as well.

Fig. 5 cites the control indicators for the proportionate outlay of steel, as approved by Gosgrazhdanstroy. The data obtained testify that for 5-story buildings in 8--9 point seismic zones these indicators are higher than the outlay of steel in the optimum variants; in buildings 12--16 stories in height in the 9-point zone they are somewhat lower, while in the 8-point zone they are close to optimum. In 7-point and non-seismic zones the control indicators for steel outlays are higher than the optimum. Taking into consideration the fact that the volume of construction in the 7-point and non-seismic zones is considerably more than it is in the 9-point zone, an appropriate adjustment of the steel outlay indicators in buildings made of monolithic concrete as a whole throughout the country would lead to a substantial savings of metal.

On the basis of the analysis which has been conducted the following conclusions may be drawn.

The selection of the optimum parameters for the structural diagrams of apartment houses made of monolithic concrete in Climate Zone IV with a seismicity of from 7 to 9 points allows a reduction in costs of from 10 to 30 percent, in capital investments to construction organizations and

allied production branches of 15--45 percent, in operating expenditures of 6--35 percent, in concrete outlays of 15--45 percent, and in metal outlays 25--45 percent.

In erecting buildings with volumetrically adjustable forms a narrow spacing of bearing walls amounting to 3--3.6 m is optimum in non-seismic zones. With an increase in the seismicity of the construction zone and the number of the building's stories, the optimum spacing of bearing transverse walls increases to 6 m.

In erecting buildings by means of sliding forms, regardless of the seismic points and the number of stories, a wide spacing of interior bearing walls, ranging from 4.8 to 6 m, is optimum.

The control figures for metal outlay in monolithic buildings designed for a 7-point seismic zone may be reduced on an average of 20 percent, whereas in a 9-point zone for buildings ranging in height from 12 to 16 stories they must be increased.

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CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

LACK OF GUIDANCE IN CONSTRUCTION CAUSES SHORTCOMINGS

Tashkent EKONOMIKA I ZHIZN' in Russian No 7, Jul 79 pp 61-62

[Article by B. Aleksandrov: "Construction Project Without a Boss"]

[Text] In Kashkadarinskaya Oblast, as also throughout the republic, the process of eliminating farmsteads is being developed intensively, along with the construction of well-laid-out settlements for rural inhabitants, provided with all municipal conveniences. A special place is occupied among them by Pachkamar, a settlement of livestock breeders, located in Guzarsk Rayon. It is an experimental pilot project, and, based on its experience, it has been proposed to check out the quality of sociological developments and design solutions; it is here that the oblast's rural builders are supposed to learn things.

Let us say straight out: no positive experience has been gained. But first, let us talk about the settlement. At the beginning of 1973 the Uzgiprosel'stroy Planning Institute issued its plan to the builders. It contained 70 cottages with a total area of more than 6,500 sq. m, a school and other children's institutions, a complex of everyday services and an ATS (Automatic Telephone Station) a bath and laundry, tea-shop, boiler house and cleaning facilities, a park, sports areas, and a great deal else. In this same year PMK-78 of Trust No. 19 "Kashkadaroblsel'stroy" began to implement the plan.

Six years have passed, and the construction of the settlement is still not complete; only half of what was planned has been built. Of the projects listed above only 4,300 sq. m of housing, the school and the boiler house have been put into operation. Year after year PMK-78 has failed to fulfill its planned quota of construction work, and its quality leaves much to be desired. And this is all because the Pachkamar projects turned out to be lacking in skilled personnel. The workers here are basically rural inhabitants, having previously had only the remotest idea about such large-scale construction. The trust has not sent experienced engineers here, while those who, without any particular process of selection, are entrusted with the duties of construction supervisors and

section chiefs are changed at least twice a year. Furthermore, the PMK itself has had three changes of its chief in the past two years. The latest--Uzbekbai Khaldarbekov--took up his position three months ago and, naturally, has not managed to thoroughly figure out the business of the Pachkamar construction project. The others did not manage to do this either.

The trust has exhibited insufficient concern over personnel. Although a branch of the training combine was opened up in conjunction with the PMK-78, the level of instruction there was so low that its graduates, upon arriving at the projects, have turned out to be just as helpless in construction work as they were just before training. As a result, there are low wages and a great deal of turnover.

The trust has also poorly resolved the problems of planning construction in the settlement. We are not talking here about the full completion of the work, but about the fact that nobody knows definitely when this or that facility will be put into operation or what volume of construction will be completed within such and such a period.

The lack of construction project boss is apparent in everything. It is precisely for this reason that the Ministry of Rural Construction can in no way provide the settlement construction project with pipes 80 cm in diameter. More than 100 km of the latter are needed to lay a water pipeline from the Kashkadaryya River. The water from the nearby Pachkamar Reservoir is saline and unsuitable either for drinking or for construction needs.

The settlement's inhabitants are also experiencing other difficulties. Its supply of food products, industrial goods, and gas is poorly organized. The good things of modern-day living, which the livestock breeders had counted on six years ago, have just not come to Pachkamar.

And in general the great and good cause of creating a genuinely urban way of life for the livestock breeders of the settlement has gradually run into a blank wall. And there is no longer any desire to extricate it from this dead end neither on the part of the general contractor nor the customer--the Uzbek SSR Ministry of Agriculture. The plans for building up Pachkamar are gradually being shunted aside, and the question has been raised more than once now of removing the designation "experimental-pilot" from this settlement.

That is understandable: the experiment has not succeeded so far, and there is no pilot project to be shown. Nevertheless, has not the experimental Kashkadarinskiy Trust turned away from it too easily, and has not the Ministry of Agriculture too calmly forgotten what an enormous influence on the build-up of our villages, on the elimination of the farmstead

system of settlement, and on the raising the culture of everyday life in the village must be exerted by settlements such as Pachkamar? Not the present-day Pachkamar, but the one which still "looks" at us from the architects' high-quality drawing paper, and which we must re-create without fail during our waking hours.

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CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

MONOLITHIC CONSTRUCTION OF APARTMENT HOUSES

Tashkent EKONOMIKA I ZHIZN' in Russian No 7, Jul 79 pp 57-58

[Text] The scope of housing construction is a legitimate source of pride among the Soviet people. No other country has so successfully solved the housing problem as has ours. And now, when most of the needs of the population for apartments have been satisfied, architectural expression in housing construction has become one of the principal questions on the agenda. Justifiably unfavorable criticism is caused by the monotonous apartment houses being built in most districts, as well as by the primitive quality of their design solutions.

But one must proceed from practical realities, and these are such that guaranteeing a rapid pace of construction, industrial methods are still incapable of satisfying our aesthetic demands with regard to housing. This is why, along with building apartment houses of prefabricated elements, they are being built more and more frequently of monolithic concrete and keramzit concrete, using sliding forms.

Designers and builders from Baku, Kishinev, and Alma-Ata have been working very successfully along these lines. There has also been an attempt to master this method in our republic, but on the whole we are lagging considerably behind. Only one experimental apartment house of this type has been put into operation in Angren', an apartment house has been under construction now for over two years in Dzhizak, and work is proceeding slowly on the construction of a 16-story apartment house on V. I. Lenin Prospect in Tashkent. Let us add that for the experiments in Angren' and Dzhizak extremely poor designs were selected; they not only fail to reveal the architectural possibilities of erecting apartment houses, using the sliding-forms method, but they even discredit the latter.

Nevertheless, the experiment was useful, since it showed the need for more precise labor organization on the construction site, as well as for an on-schedule and smoothly regular supplying of the facilities which were being erected, using the sliding forms, and it posed a number of problems with regard to further improving this method.

It has become clear that the construction of similar projects must be carried on by a specialized contracting organization which would ensure a rigorously maintained construction schedule. It is necessary to broaden their material base, outfitting them with special equipment, rigging, and machinery. In the first place, they need forms and jacks to lift them. And, finally, in order to design projects to be made of monolithic reinforced concrete, engineering specialists must be enlisted at the earliest stages.

Utilizing experience gained in erecting apartment houses by means of sliding forms, as accumulated in our republic and throughout the country, a patent group under the direction of Chief Project Architect V.V. Bortnikov and Chief Engineer A. Mamasaliev worked out a series of plans for 9-, 12-, and 16-story apartment houses, to be built of monolithic concrete.

This series is earmarked for construction in oblast and industrial centers of the republic where a base for high-rise, large-panel, apartment-house construction has been insufficiently developed. The apartment houses of this series are intended to be the dominant accents in the build-up of their districts, as well as increasing their density. The architectural-planning solutions for these buildings can be multi-variant, which allows them to be built with individual spatial compositions, and the creation of non-repetitive ensembles is permitted. This is facilitated by the basic plan which was adopted--standardized apartment blocs and stairway-elevator complexes, likewise ensuring the stable standardization of the sliding-forms equipment.

Expenditures for making the forms amount to approximately 75-80,000 rubles with a metal outlay of about 80 tons for the rigging unit. The rigging, moreover, taking into consideration the fact that its boards will be used many times, will pay for itself rather soon.

The estimated cost of construction in comparison with large-panel apartment houses is reduced by 11--12 percent, and the outlay of steel--by 15 percent, with some increase in the outlay of cement--by approximately 5 percent.

Labor outlays at the construction site also increase by 15--20 percent. If, however, the labor consumption required to make panels in plants is taken into consideration, then the labor outlays in panel construction turn out to be no less. And all this with the obvious advantages of the monolithic construction of buildings with a large number of stories as compared to large-panel buildings in strength and stability, which allows them to be erected in active seismic zones, with less metal consumption and at a lower estimated cost.

The engineering plan for the series of 9-, 12-, and 16-story apartment houses, along with their products list, has been approved by UzSSR Gostroy for experimental construction on the territory of the UzSSR.

However, and unfortunately, that is where the matter now rests. The USSR Ministry of Construction is stubbornly resisting the implementation of these plans. It would be desirable to have the higher-ups in the ministry furnish a detailed and public explanation of the reasons for their not wishing to erect these beautiful and economical apartment houses.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

MEASURING EQUIPMENT DEPRECIATION IN TERMS OF OPTIMUM SERVICE LIFE

Moscow PLANOVYE KHOZYAYSTVO in Russian No 9, Sep 79 pp 53-60

[Article by Candidate of Economic Sciences P. Orlov]

[Text]. Under developed socialism, prompt up-dating of production equipment with consideration of the latest achievements of scientific and technical progress is one of the most important factors in increasing social production effectiveness. For each unit of equipment there objectively exists an optimum service life which if followed ensures the greatest effectiveness of use. Any deviation from it to either side increases social labor expenditures.

In order to up-date equipment, we need to know the optimum service life of equipment of each type and the service life which has actually been the case, as well as losses from exceeding optimum service life. The methods of determining actual equipment service life have been worked out, and when they are used, difficulties arise only when the needed information is absent in the reporting done by enterprises, associations, main administrations and ministries. Establishing optimum service life is more complicated.

Soviet scientists have proposed a number of methods for determining optimum equipment service life.¹ Analysis and generalization of these methods enables us to work out a unified methodological approach to evaluating optimum equipment service life which will serve as a basis for creating branch methods

1. See, for example: V. V. Novozhilov, "Problemy izmereniya zatrat i rezul'tatov pri optimal'nom planirovaniyu" [Problems of Measuring Expenditures and Results Given Optimum Planning], Moscow, Nauka, 1972; S. Ye. Kantorer, "Amortizatsiya i sroki sluzhby mashin i oborudovaniya v stroitel'stve" [Depreciation and Machinery and Equipment Service Life in Construction], Moscow, Stroyizdat, 1975; R. N. Kolegayev, "Economic Evaluation of Machinery Life," STANDARTY I KACHESTVO, No 8, 1976, pp 24-26; "Sroki sluzhby i normy amortizatsii osnovnykh fondov v promyshlennosti" [Service Life and Depreciation Norms for Fixed Assets in Industry], Moscow, Ekonomika, 1974, and others.

which take into account the specific features of individual types of equipment. However, only certain ministries have undertaken on their own initiative the preparation of branch methods for determining optimum service life and directing equipment up-dating.

The absence of a single normative document regulating the algorithm and general principles of setting optimum service life leads to a situation in which various methodological approaches to evaluating the influence of physical wear and especially of scientific and technical progress on different types of equipment are used in practical calculations. Consequently, the question of working out standard methods for determining optimum service life and directing equipment up-dating which will be mandatory for all ministries and departments is urgent.

Recording equipment depreciation with a view towards observing economically advantageous service life plays an important role in directing equipment reproduction. As of 1 January 1975, new and higher depreciation deduction norms for national economic fixed assets have been in effect. For machinery and equipment as a whole, the normative service life has been reduced from 14.4 to 12.2 years, or by 15.3 percent; for machine tools -- from 21 to 17 years, or by 19 percent; for computer equipment -- five-fold. On average for the national economy, the major overhaul deductions norm has been decreased by 18 percent.¹ The new depreciation deduction norms take into account changes in fixed assets reproduction which had occurred since the previous norms were adopted in 1963 and more accurately reflect the actual service life of means of labor.

At the same time, depreciation deduction norms are only one element of the depreciation system, which requires a comprehensive approach to solving such problems as the procedure for deducting and using depreciation deductions, the procedure for compensating for incompletely depreciated means of labor being liquidated, and methods of revealing equipment to be written off. In a majority of cases, the service life established by existing depreciation deduction norms for USSR national economic fixed assets govern solution of the problem of writing off individual pieces of equipment.

Such an approach to directing equipment up-dating cannot be considered substantiated, for a number of reasons:

depreciation deduction norms are generally in effect for more than 10 years, but equipment reproduction conditions change continuously. Therefore, the most justified depreciation norms remain so only for a somewhat limited time interval out of the total period they are in effect;

economically appropriate service life for similar types of means of labor are random values which change within certain limits. This is to be explained by the influence of the following factors: quality of manufacture, operation and maintenance; level of extensive and intensive use; natural

1. M. Zavalishchin and A. Masal'skiy, "New, Unified Depreciation Deduction Norms," in PLANOVYE KHOZYAYSTVO, No 11, 1974, pp 62-63.

conditions, and so on. But normative service life is a discrete value, so by its very nature it cannot serve as a criterion for writing off individual pieces of equipment;

The normative service life for similar types of equipment is often set the same for all branches of the national economy, although the conditions under which the equipment is used (load in terms of time and capacity, quality of maintenance, and so on) can differ substantially within a branch and even within an enterprise. Moreover, each of the 1,772 group depreciation deduction norms is intended for several inventory objects of similar designation. But for certain branches (pulp and paper, cotton, sugar and others), these norms are set for an entire complex of technological equipment.

Equipment of one type but of different models can differ substantially in terms of technical-economic level, but the normative service life set for them is identical. Take, for example, code 40 604 for the groups and types of fixed assets titled "General-Purpose Class 3.0 Caterpillar Tractors: DT-75, DT-75M...DT-54A, T-74, T-150."¹ The T-150 is approximately 40 percent more productive than the T-74, but the normative service life is the same, eight years, for both.

Depreciation deduction norms for the renovation of certain types of machinery are set in calendar time for two-shift operating conditions, regardless of the actual conditions of use. Consequently, machinery of the same type, but operating in one, two or three shifts, has an identical normative service life. The economically appropriate service life for machinery used in three shifts, other conditions being equal, will be shorter and for that used in one shift -- longer, than for machinery operated in two shifts. Although the direct dependence between the indicated values is most often not observed.

The above permits the conclusion that existing service life normatives cannot be a criterion for writing off individual pieces of equipment. This is also supported by the fact that, in V. Yu. Budavey's estimation, the following relationship exists between the actual (T_a), normative (T_n), economically appropriate (T_e) and calculated equipment service life in terms of the balance of equipment (T_c):²

$$T_a > T_n > T_e > T_c$$

1. See: "Normy amortizatsionnykh otchisleniy po osnovnym fondam narodnogo khozyaystva SSSR i Polozheniye o poryadke planirovaniya, nachisleniya i ispol'zovaniya amortizatsionnykh otchisleniy v narodnom khozyaystve" [Depreciation Deduction Norms for USSR National Economic Fixed Assets and Statute on Procedures for Planning, Adding On and Using Depreciation Deductions in the National Economy], Moscow, Ekonomika, 1974, p 25.
2. See: V. Yu. Budavey and M. I. Panova, "Ekonomicheskiye problemy tekhnicheskogo progressa" [Economic Problems of Technical Progress], Moscow, Mysl', 1974, p 155.

Actual equipment service life is generally longer than normative. However, setting unrealistically short normative service life facilitates the inefficient use of new equipment resources, in our opinion. Let us demonstrate by an example. Suppose the normative equipment service life is seven years, the economically appropriate service life is five years, and that which is ensured by existing resources is 12 years. The most effective decision under such conditions would be to replace obsolete equipment which had been used for more than 12 years. But consumers, governed by depreciation norms, will try and sometimes succeed in replacing it after the seven-year normative service life is up. Because of this, other consumers will be left operating the most obsolete and obsolescent equipment, with a service life of more than 12 years, and its operation will incur large losses. Thus, new equipment resources will be used inefficiently. But given inflated normative service life, as against that ensured by the equipment balance, equipment which will be replaced first will be that which is most obsolete. And this is preferable.

In concerns recommendations on planning equipment replacement, in the Depreciation Deduction Norms they are reduced to the following point: "The value of fixed assets departing due to decrepitude and wear is determined on the basis of data on the planned departure in the planning year and is set as a function of the production program, age of the fixed assets, economically appropriate and normative service life, and number of machines singled out for replacement, as well as with consideration of actual fixed assets departure during preceding years."¹ It is not clear from this recommendation how the planned equipment replacement schedule will depend on the normative and economically appropriate service life, much less on the departure of fixed assets in preceding years. Neither does it explain how to determine economically appropriate service life.

For example, IZVESTIYA reported that the Main Administration of Mechanization of the RSFSR Ministry of Agriculture permits subordinate enterprises to write off up to 12.5 percent of the existing tractor and combine fleet each year based on existing depreciation deduction norms on renovating this equipment (12.5 percent). If the indicated figure is exceeded, an explanation is demanded.² Neither the unevenness with which machinery arrives in individual years nor their level of use is taken into account. As a result, hundreds of different tractors and combines stand idle for years on end in the machinery yards, waiting for the write-off period to be up.

Given such an approach to writing off machinery, farms with a "young" fleet of machinery and using it poorly in terms of time and capacity turn out to

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1. "Normy amortizatsionnykh otchisleniy po osnovnym fondam narodnogo khozyaystva SSSR i Polozheniya poryadke planirovaniya, nachisleniya i ispol'zovaniya amortizatsionnykh otchisleniy v narodnom khozyaystve," p 122.
2. See: V. Lanskikh and N. Turygin, "How Much to Work a Tractor" in IZVESTIYA, 11 Sep 76.

be in an advantageous position. They can write off the same percentage of their equipment as farms with a high level of extensive and intensive machinery use and as farms with obsolete and obsolescent equipment. It is therefore necessary to improve management of production equipment up-dating.

It is of great importance to establish scientifically substantiated service life normatives. However, it should be borne in mind that no normatives (especially those in effect for at least 10 years) can take into account all the diverse factors which determine an optimum period of use of each unit of equipment under concrete conditions. The "Depreciation Deduction Norms for USSR National Economic Fixed Assets and Statute on Procedures for Planning, Adding On and Using Depreciation Deductions in the National Economy" should, in our opinion, note that service life normatives are averaged, probable values and cannot serve as criteria for writing off individual units of equipment. Precise recommendations are required on disclosing equipment to be written off in a planning period. It is necessary that service life normatives correspond to the service periods ensured by long-range equipment balances.

In turn, when compiling long-range balances, the release of equipment intended to replace obsolete equipment should be planned on the condition that service life gradually diminishes to an optimum with consideration of the simultaneous influence of physical wear and scientific-technical progress. Capital investment is the basic limitation. The greater the gap between the technical-economic level of existing equipment and similar models being produced or developed, the faster the production of such equipment should be increased in the planning period to accelerate equipment up-dating. And the reverse. As was noted above, it is better to have service life normatives somewhat inflated above those ensured by the equipment balance than to have them understated. The following relationship should be observed:

$$T_s = T_e \geq T_*$$

The depreciation system should, in our view, be made more flexible; the cost-accounting interest of enterprises in using equipment effectively and following economically appropriate service life recommendations should be strengthened.

According to the Statute on Procedures for Planning, Adding On and Using Depreciation Deductions in the National Economy (1975), these deductions are made for full renovation and major overhaul throughout the entire actual service life of the equipment. Losses from incomplete equipment depreciation are reimbursed through profit, with the exception of instances when the replacement is made in accordance with the planned introduction of new equipment. In this regard, it is generally to the enterprises' advantage to write off equipment at the instant the amortized service life period has expired, since as equipment service life increases, its average annual output decreases and expenditures on all types of maintenance increase.

Depreciation deductions for renovation and major overhaul are made in equal annual amounts. Therefore, as equipment service life increases, based on accounting data, specific expenditures per unit of output increase for all components.

From this point of view, it is advantageous to write off equipment prior to expiration of the normative service life, but that is associated with compensating for incomplete equipment depreciation through profit. When equipment is replaced within the normative service life, enterprise outlays reflect actual expenditures on equipment renovation (taking into account the fact that decreased profit is equivalent to increasing prime cost), but as the normative service life expires, expenditures on equipment renovation increase as against actual expenditures in direct proportion to the number of years by which the normative service life is exceeded.

Recompensing losses from incomplete amortization through profit when obsolete equipment is replaced prior to expiration of normative service life facilitates reducing enterprise profit and lowering profitability, and in so doing it retards the introduction of new equipment.

When enterprises are permitted to write off losses from incomplete amortization by reducing the state fund (through the state budget), cost-accounting indicators will be better for them the more often equipment is replaced. When equipment is replaced prior to expiration of the normative service life, actual expenditures on its renovation are lowered, and when replacement occurs beyond the normative service life they are raised. And the amount by which actual equipment renovation expenditures are lowered is directly proportional to the number of years between replacement and expiration of the normative service life.

For example, if equipment with a normative service life of 10 years is written off after one year, based on accounting data, expenditures on its renovation will be reduced by nine-tenths of its balance value, that is, 10-fold, as against actual renovation expenditures. Enterprises with opportunities for obtaining more new equipment and up-dating equipment extremely often turn out to be in an advantageous position. With the accelerated up-dating of equipment, artificial inflation of enterprise cost-accounting indicators stimulates premature replacement, which conflicts with national economic interests.

Statistical data also confirm the tendency towards growth in the amount of write-off of "young" equipment, relating losses from its incomplete amortization to the state fund account. For example, since 1967, when it was permitted to apply losses from incomplete equipment amortization to reducing the state fund, the proportion of machine tools less than 10 years old which were scrapped increased and the proportion over 20 years old has decreased.

The amount of residual value in liquidated fixed assets remained considerable even after the introduction of new and higher renovation depreciation deduction norms in 1975. Thus, in 1976, losses from the liquidation of fixed

assets were 17.7 percent of their initial value for the national economy as a whole and 20.9 percent for industry.¹ Unfortunately, applying losses from the incomplete amortization of equipment to reduce the state fund also predominates today. Proponents of writing off losses from incomplete amortization to reduce the state fund argue their point of view by saying that the incomplete amortization of some units of fixed assets is covered by the over-amortization of others.²

The amount of over-amortization of fixed assets is not estimated, but there are grounds for assuming that over-amortization exceeds under-amortization for certain types of equipment in the final analysis. For example, an analysis of write-off documents for 157 ZIF-1200 drilling units operated in the "Artemgeologiya" Trust of the Ural'sk and Krasnoyarsk geological administrations showed that, given a normative service life of five years, they were actually operated from three to 10 years prior to write-off. With a probability of 95 percent, the average actual service life of the ZIF-1200 drilling units written off was 5.8 to 6.5 years, with a most probable value of 6.15 years.

Consequently, the total amount of amortized renovation deductions for equipment written off varied from 60 to 200 percent of their initial (restored) value for individual pieces of equipment. But for the aggregate of drilling units written off as a whole, there was an over-amortization exceeding 20 percent of their value in this survey. But even if one accepts the premise that over-amortization covers under-amortization for national economic fixed assets as a whole, given such an approach, recompensing the departed fixed assets is of paramount importance. This is an important task of the depreciation system, but not the primary task. It is possible to establish deliberately overstated depreciation deduction norms and ensure not just full reimbursement of departed fixed assets, but also a considerable over-amortization. However, that is not desirable.

Both over- and under-amortization of fixed assets are consequences of inaccurate determination of production outlays. In under-amortization, the calculated national income is inflated as against actual income. In over-amortization, on the other hand, it is understated and the proportion of the reimbursement fund in the aggregate social product is correspondingly inflated.

Actual production outlays are influenced by the actual value of fixed assets consumed in the production process, regardless of whether it accords with the full recovery of depreciation deductions. This means that, other conditions being equal, actual production outlays and national income amount are

1. M. Zavalishin and A. Masal'skiy, "New Depreciation Norms. Results and Problems," in PLANOVYE KHOZYAYSTVO, No 5, 1978, p 72.
2. See: D. M. Palterovich, "The Function of Depreciation in the Economic Mechanism," in EKO, No 3, 1975, pp 31-32.

identical, in spite of whether or not there will in the end be an over- or under-amortization of fixed assets. But society is interested in a correct calculation of production outlays, and consequently in a coinciding of depreciation deductions and actual value of fixed assets consumed in the production process.

A more important task of the depreciation deduction system, in our opinion, is to stimulate the efficient use and timely up-dating of equipment. We take efficient use to mean an optimum load in terms of time and capacity, being careful how equipment is used, high quality of operation, technical servicing and maintenance. We take timely up-dating to mean replacement of equipment at economically appropriate times, so as to ensure minimal expenditures per unit of output.

With a view towards stimulating the efficient use and timely up-dating of equipment it is appropriate, in our opinion, to apply the difference between depreciation deductions for major overhaul and actual expenditures to reducing or increasing output prime cost after each major overhaul of a unit of equipment. Total enterprise outlays will include actual expenditures on technical servicing, routine maintenance, and also those on average and major equipment overhauling. Enterprise interest in the efficient expenditure of funds on technical servicing and maintenance will simultaneously be increased.

There have been cases in which depreciation funds not completely used for major overhaul have been directed by enterprises into financing routine maintenance documented as being major overhaul. Thus, the depreciation fund intended to finance major overhaul is sometimes used to artificially lower output prime cost and increase profit. The potential for this is great, since it is often difficult to distinguish between routine maintenance and major overhaul in practice. Among enterprises with equipment that is up-dated unnecessarily often, expenditures on major overhaul drop sharply and as a result, an excess depreciation fund is generated, becoming an additional source for artificially improving cost-accounting indicators. This is one more stimulus to extremely frequent equipment up-dating.¹

In our opinion, enterprises should be permitted to write off the depreciation on each unit of equipment through depreciation sums accumulated for future major overhaul and only when such funds are insufficient should this be done through profit.

Depreciation deductions must not be made for full restoration of equipment after its value has been recompensed. Given such an approach, these deductions will generally cease at the instant the normative service life of the equipment has expired.

1. Obvious shortcomings in the two sources of financing expenditures on equipment repair resulted in the transfer in 1964 (GDR) and later (Hungary and Poland) to financing major overhaul directly through output prime cost.

Practical introduction of the two latter proposals will ensure that the value of each unit of equipment written off will coincide with total depreciation deductions for renovation included in the prime cost of the output produced using that particular equipment (or the work so produced) over its entire service life. And with consideration of the preceding proposal, all expenditures on partial and full equipment reproduction will be reflected accurately in the production outlays being recorded. When economically appropriate, equipment can be written off prior to expiration of its normative service life. Recompensing losses from under-amortizing equipment through depreciation sums for major overhaul does not worsen economic activity indicators.

For example, the normative service life for multipurpose and specialized machine tools weighing up to 10 tons and operating with a metal tool in mass- and series-production machine and assembly shops is two repair cycles, not to exceed 15 years, and total depreciation deductions are 14.1 percent, including 6.7 percent for renovation and 7.4 percent of the initial value of the equipment for major overhaul. When writing off losses from under-amortization through major overhaul depreciation sums, an enterprise can, when economically appropriate, decline to make such repairs, recompense the full value of the machine after 7.1 years of operation ($100/14.1$) and write it off.

Consequently, the period in which full amortization of a machine is ensured is reduced from 15 to 7.1 years, that is, by more than 50 percent. Instead of being discrete, it becomes continuous and stays between 7.1 and 15 years.

In our opinion, the practical introduction of the proposals put forward in this article will strengthen enterprise interest in using equipment efficiently and up-dating it promptly, thanks to which enterprise outlays will first of all reflect actual expenditures on renovating and repairing each piece of equipment. Given the effective use and replacement of equipment within economically appropriate periods, minimum expenditures of social labor per unit of output will be ensured and, consequently, so will the best enterprise economic activity indicators. Second, the amortization system will become flexible, permitting full recompensation of equipment value and its replacement by new equipment prior to expiration of normative service life when economically appropriate.

The proposal to stop depreciation deductions for full restoration of equipment upon expiration of normative service life has been advanced repeatedly. Opponents of instituting this procedure think it would artificially increase the effectiveness of old assets and reduce the effectiveness of replacing them. But the results of calculations of optimum service life for a number of machines done by the author using Professor R. N. Kolegayev's method have shown that, given a certain impact from replacing equipment operated longer than the optimum service life, depreciation deductions on its renovation need not be considered. If normative service life is less than optimum, stopping such depreciation deductions does not diminish the result of replacing old assets with new ones, but makes the calculation more precise.

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METALWORKING EQUIPMENT

PERFORMANCE, PLANS AT ORDZHONIKIDZE MACHINE-BUILDING PLANT REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 40, 1979 p 4

[Article: "Successfully Completing the Five-Year Plan"]

[Text] The collective of the leading enterprise of a Moscow production association, the Machine Building Plant imeni Sergo Ordzhonikidze, is successfully carrying out the assignments for this year and has begun active preparation for the concluding year of the Tenth Five-Year Plan. It is now developing a counterplan for 1980 and determining the targets for the machine-builders to attain so as to surpass the main technical and economic performance indicators for growth of production effectiveness and work quality that have been established for the last year of the five-year plan.

Deputy Director-General of the association V. L. Pashchenko tells us how the counterplan is being developed.

The decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism mentions "beginning development of the annual plan from below, starting with the production associations (or enterprises) and organizations." It also declares that the collectives shall propose counterplans based on utilization of latent internal potential. It is on the basis of these directives that the workers in our enterprise are currently organizing their comprehensive preparation for the work of 1980.

Counterplanning gives the greatest effectiveness to mass socialist competition. Our own experience is proof. The counterplan for 1979 was developed and approved by the party and operations aktiv of the plant imeni Ordzhonikidze. EKONOMICHESKAYA GAZETA described it in its issue No 34 for 1978.

We may now report the main results of the enterprise's operations. Our plant is producing automatic lines for the automotive industry and the tractor and agricultural machinery industry, as well as automatic machine tools. This year we have made great headway in technical progress. For example, in the first half

year we sent KamaZ [Kama Automotive Plant] a set of 11 automatic lines for machining 8-cylinder engines. It should be noted that each line is a complex installation.

We have been assigned a responsible target, that of manufacturing 14 high-output automatic lines for the Altay Engine Plant. Four of these have been sent and three more will be going out soon. There are grounds for believing that the entire order will be filled ahead of schedule. As regards the production of machine tools with numerical program control, this has been increased by half this year.

Much that is new has occurred in our production life during fulfillment of the counterplan. In the leading plant of the association, the results of competition among shops, sectors and brigades, including the determination of prize standings, was carried out every month rather than once a quarter as previously. The competition is now given more publicity.

The movement under the slogan "A Workers' Guarantee for the Five-Year Plan of Quality" has become more effective and acquired a greater mass character. Many collectives of associated mechanical and assembly shops are competing on a contract basis. Not so long ago the NC machine tool assemblers issued a challenge to the workers of the No 2 mechanical shop, who sometimes were delivering parts that went to make up sets late. After a socialist cooperation contract went into force, the number of complaints in both directions decreased sharply. A good example of cooperation is given by the brigades of fitter Boris Shibryayev and J [the operator Vladimir Kol'tsov (who make parts for the assemblies of automatic lines) and the brigades of Aleksey Sokolov and Vladimir Potseluyev of the neighboring shop which puts these assemblies together.

According to the plant's five-year plan, the percentage of products with the State Seal of Quality was to increase to 45 percent of total output by 1980. Now, however, the figure has already reached 51 percent. A comprehensive system of quality control is currently in effect in the enterprise. The quality stations--which are in every shop--are performing an extremely useful role.

Overall, the plant's performance indicators are as follows. According to the five-year plan assignments for 1978, we were to increase our output by 41.8 percent over 1975, while the counterplan called for an increase of 44.4 percent. Actually, we expect that the increase will be roughly 58 percent. It will be achieved without any increase in the number of workers, and solely through increased labor productivity.

The entire production association, which also includes the Moscow Spetsstanok plant, the Tula Machine-Tool Casting Plant and the Brasovskiy Machine-Tool Building Plant (Bryanskaya Oblast), is overfulfilling its five-year plan assignments.

The experience of counterplanning is being expended and improved, and the collective is continuing its search for new production potential. We plan to include in our counterplan for 1980 the following indicators:

an increase in output of 68 percent over 1975, against a five-year plan target of 65 percent;

production of 16 automated lines for KamAZ at the level of the best currently available models, equipped with controllers;

ahead-of-schedule completion of the manufacture of products for agricultural machine building, and production of two automated lines for the Taganrog Combine Plant and three lines for the Minsk Motor Plant in the first half of 1980 instead of the second half as per plan;

production of 200,000 rubles worth of output above that assigned by the Ministry of Machine Building for 1980, and realization of the entire increase in output through improved labor productivity.

Currently the draft counterplan for next year is undergoing comprehensive discussion in party and workers' meetings in the shops. Collection of suggestions to aid the comprehensive effort to improve effectiveness and quality and save metal, fuel, electrical energy and other material and technical resources has been organized. The draft plan includes other latent potential. More than half of the piece workers have undertaken to fulfill their personal five-year plan assignments for increasing labor productivity ahead of time, by the 110th anniversary of V. I. Lenin's birth. Many innovators have already achieved this goal. They include Hero of Socialist Labor V. G. Komarov, State Prize winner V. N. Ledovskikh, A. F. Shumilkin and others.

After the counterplan is approved by a meeting of the plant's party and operations aktiv, it will be presented to the Ministry of Machine Building for inclusion in the annual plan.

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METALWORKING EQUIPMENT

HEAVY MACHINE BUILDING PICTURE FOR YEAR TO DATE REPORTED

Moscow EKONOMICHESKAYA GAZETA in Russian No 42, Oct 79 pp 1-2

[Article: "Heavy Machine Building"]

[Text] The production associations and plants of the Ministry of Heavy and Transport Machine Building [Mintyazhmash] are filling orders for new equipment for ferrous and nonferrous metallurgy, ore enrichment, the oil and gas industry, and railway, marine and river transport. Increased quantities of hoisting and transport equipment are being shipped to all sectors of the national economy. During 3 1/2 years of the Tenth Five-Year Plan, the production of 650 basic types of new machinery and assemblies has been mastered.

Workers in the sector learned of the decisions of the party and state regarding improvement of the economic mechanism with great satisfaction. A certain amount of experience has been accumulated in this area. Beginning with the second half of 1977, the associations, plants and Mintyazhmash as a whole changed over to a new procedure for planning and evaluating work: on the basis of net (standard) output. The advantages of this performance indicator have been confirmed in practice.

Most of the enterprises in the sector are successfully meeting their assignments for product output, growth of labor productivity, and profit. As shown by the figures presented, product output calculated as standard net output increased in 1978 by 18.5 percent compared with 1975. The labor productivity level increased by 17.2 percent.

Since the beginning of the Tenth Five-Year Plan, the sector has been overfulfilling its assignments for deliveries of enrichment and agglomeration equipment, drilling rigs, excavators, tunneling combines, drags, special-purpose railcars and several types of diesel engines and diesel generators. At the same time, there has been some lagging in the production of main line and switching diesel engines, freight cars and cranes.

Technical progress in the sector during the Tenth Five-Year Plan has been characterized by the development of new high-output units. These include such unique

machines as a forging press which develops 65,000 tons of pressure, hydraulic excavators with a bucket capacity of 12 and 20 cubic meters, converters with capacities of 350-400 tons, and a 6,000-horsepower passenger diesel engine.

Product Output in Enterprises of Mintyazhmash (standard net output; 1975 = 100)

| 1975 | 1976 | 1977 | 1978 | 1979 (plan) |
|------|-------|------|-------|-------------|
| 100 | 106.7 | 112 | 118.5 | 123.6 |

The pacesetter in heavy machine building, Uralmash, has manufactured a universal mill for rolling wide-flange beams with an output of 1.5 million tons a year. The use of such beams in the national economy will give an annual economic effect on the order of 40 million rubles. The collectives of Uralmash and the South Urals Machine Building Plant (Orsk), in cooperation with VNIMetmash [all-union scientific research institute of metalworking machinery] scientific and production association (Moscow), have developed a series of continuous slab casting machines. The production cost of the slabs has decreased by 10-12 percent, and the labor productivity of the metalworkers has increased by 28 percent. The quality of the rolled product has improved. The annual economic effect of the use of such machines in the Novolipetsk Metallurgical Plant alone amounts to 22 million rubles.

Coal opencuts are receiving from the Novokramatorsk Machine Building Plant association rotor complexes capable of unloading ore from two railcars simultaneously. The oilfields of West Siberia have received highly effective installations for drilling up to 16 wells from a single site.

In 1976-1978, 461 products received the State Seal of Quality, and the percentage of such products in the total output reached 28.5 percent; the five-year plan assignment for this indicator is being fulfilled. Since the beginning of this year, 69 more products have received the pentagon of honor.

A significant increase in production capacities has resulted from the reequipping and reconstruction of heavy and transport machine-building plants. The total metalworking equipment inventory has increased by 11 percent. By the end of the five-year plan, 34 new comprehensively mechanized shops and about 300 sectors will have been created.

This year the workers in the sector are competing to increase output by 4.3 percent over last year and to obtain 92 percent of this increase through higher labor productivity. According to preliminary data, Mintyazhmash has overfulfilled its nine-months' plan. An additional 11 million rubles worth of product has been sold.

The collectives of most production associations and plants in the sector are confidently carrying out their counterplans and socialist commitments undertaken for 1979. The machine builders of Uralmash (association general director Ye. Varnachev) have supplied a large quantity of complex equipment to priority metallurgical projects. It is now completing work on an order from the Tyumen' oil workers for higher-quality sets of drilling rig equipment for cluster drilling

of wells in difficultly-accessible areas. The brigade form of labor organization has been introduced in the shops. Multidisciplinary brigades working on a single order are being used more widely.

Output of Products with State Seal of Quality (percent of total output)

| 1976 | 1977 | 1978 | 1979 (plan) |
|------|------|------|-------------|
| 20.4 | 22.7 | 28.5 | 29.4 |

At the Yuzhuralmashzavod [South Urals Machine Building Plant] in Orsk (A. Grigor'yev, director), more than 60 percent of the workers are already working in brigades. The plant has one of the top positions in the all-union socialist competition. Among the pacesetters is the collective of the Bryansk Machine Building Plant association (G. Burov, general director), which supplies diesel engines for seagoing ships, diesel switchers and other modern equipment. The Kolomenskiy Zavod association (B. Strel'nikov, general director), is doing well in the production of passenger diesels and in mastering the production of new progressive equipment. The Leningrad Hoisting and Transport Equipment Plant imeni Kirov (V. Karpukhin, director) is working steadily.

Laggard Areas

The first nine months' plan for sales of products has been fulfilled by all the all-union industrial associations of Mintyazhmash except two: Soyuzpod'yemtrans-mash [hoisting and transport machinery] (V. Pirogov, chief) and Soyuzvagonmash [railcar machinery] (A. Rechkalov, chief). But the sector still has a number of laggard enterprises. The assignments for the main technical and economic performance indicators have not been fulfilled by the machine builders of the following plants: the Stakhanovskiy, Belokholunitskiy, and Dvigatel' Revolyutsii (Gor'kiy), and the Kran (Uzlovaya, Tul'skaya Oblast) and Rudgormash [mining equipment] (Voronezh) production associations.

Although the delivery of machinery and equipment within the schedules set by contracts has improved in many production associations and plants, the ministry is lagging behind in fulfillment of assignments for the full range of products. This applies to blast furnace and steelmaking equipment, overhead traveling cranes and mechanized supports for coal mining.

Since the beginning of the year, the railroads have received less than planned: almost 3,000 freight cars, 150 mainline diesel sections and 130 diesel switchers. There are a number of causes. The Ministry of the Electrical Equipment Industry has broken its contract commitments for delivery of electrical engines for locomotives, while the USSR Ministry of the Forestry Industry has done so with regard to lumber and so-called railcar stock [vagonka].

In recent years a number of railcar building plants have been reconstructed. But the capacities of the intermediate production facilities have not been expanded sufficiently. In particular, this has resulted in a shortage of steel castings.

For example, the Bezhitskiy Steel Foundry of the USSR Ministry of Industrial Construction was to put new capacities into operation six years ago, but they still have not been constructed. Currently the project has insufficient reinforced concrete structural members and cement. The situation is no better in the priority facilities of the Kremenchug Steel Foundry. For some years now the building for the railcar truck plant, equal in area to several enterprises, at the Altay Railcar Plant has remained unfinished. Automatic lines for the production of railcar axles with a value of more than 3 million rubles are in storage there. The Ministry of Heavy and Transport Machinery is not allocating significant capital investments for the facility, and the USSR Ministry of Industrial Construction is doing poorly in its construction and installation work.

It is necessary to improve the organization of production and labor in the enterprises of the Soyuzvagonmash [railcar machinery] and Soyuzteplovozput'mash [diesel locomotive and track-laying machinery] industrial associations. Machining equipment here is not being used to full capacity, there are considerably in-shift stoppages, and personnel turnover is high.

Railway transport sorely needs additional rolling stock. Accordingly, the questions of eliminating behindhandedness in production of railcars and diesels merits persistent attention and practical measures from Mintyazhmash and the ministries that are supplying materials and sets of parts, as well as the construction organizations.

Labor Productivity in Mintyazhmash Enterprises (1975 = 100%)

| 1975 | 1976 | 1977 | 1978 | 1989 (plan) |
|------|------|-------|-------|-------------|
| 100 | 106 | 111.1 | 117.2 | 121.8 |

Sources of Increased Output

The enterprises of the sector have great latent potential for increasing production effectiveness and work quality. Included in this potential is an increase in the changeover coefficient [koeffitsient smennosti] of metalworking equipment. For Mintyazhmash this indicator averages 1.4, which cannot be considered satisfactory. A considerable variation among plants in utilization of the machine tool inventory has been observed. In the Zhdanovtyazhmash [heavy machinery] association, the changeover coefficient for equipment has reached 1.54, while at the Uralmashzavod and the Barnaul Transport Machinery Plant it is 1.45 and at the Tikhoretsk Heavy Track-Laying Machinery Plant it is 1.66. At the same time, for the Alma-Ata Heavy Machine-Building Plant and the Penza Diesel Plant, this indicator is just above 1, while at the Nikolayevsk Machine Building Plant for Hoisting and Transport Equipment it is 0.87.

Currently Mintyazhmash, guided by the decisions of the party and state regarding improvement of the economic mechanism, is preparing to develop a log for each production association or enterprise, which will contain information on the existence and utilization of production capacities, including the changeover

coefficient. This work, which must be completed in 1980, is to be accompanied by effective measures for fuller utilization of available machine tools and other equipment.

The heavy and transport machine building industry is an extremely large consumer of metal. In the enterprises, scientific research and planning and design organizations, a creative effort is being made to decrease the metal consumption of products and lessen production waste. For example, the specific metal consumption of the machine for continuous casting of stock currently being manufactured by Uralmash for the Cherepovets Metallurgical Plant is 10/17 that of similar machines produced earlier at the order of the Lipetsk metalworkers. The metal consumption of the new model Zhdanovtyazhmash brand tank cars for hauling ammonia is 10 tons less. At the Voroshilovgrad Diesel Engine Plant, metal consumption per unit capacity of the new locomotive is 14 percent lower.

Another effective approach to saving metal in the sector is the development of rolling mills for the production of stock with low waste and the incorporation of advanced processes. For example, the development of foundry production by the comprehensively mechanized method is making it possible this year to save 5,000 tons of steel and cast iron. The production of forgings and stampings by the comprehensively mechanized method and nonoxidative heating of parts during heat treatment is becoming more widespread. To obtain more efficient use of metal in the enterprises, some parts are now assembled from metal shapes rather than using steel or iron castings or forgings.

The sectorial technological institutes are making their contribution to metal conservation. As a result of incorporation into production of new industrial processes developed by them, last year 4,700 tons of rolled steel was saved.

But the sources of metal savings in the productions associations and plants are not being used to an equal extent everywhere. For example, the Kran association was assigned the task of saving 3.7 percent on metal, while the actual saving does not exceed 1.5 percent. The picture is no better at the Yasnogorsk Machine Building Plant. And at the Kryukov Railcar Plant only half a percent is being saved on metal instead of 4.2 percent.

But there is no need to go far to find positive experience. The plan assignments for metal savings are being overfulfilled by the Voroshilovgrad Diesel Plant, the Elektrostal'skiy Heavy Machine Building Plant association, and the Aleksandrinskiy Hoisting and Transport Equipment Plant. This is being achieved by use of effective curved structural shapes, welded castings, and efficient cutting out of rolled stock.

The achievement of high production indicators is aided by brigade competitions and personal economy accounting, which is in widespread use in Uralmash and in the shops of a number of other enterprises. Mintyazhmash and the all-union production associations have been called upon to disseminate widely valuable experience in saving metal, fuel and electrical energy. The creative forces of workers and engineering and technical personnel, as well as inventors and efficiency improvers, must be drawn into this work to a greater degree.

A Course for Technical Progress

The successful fulfilment of the tasks facing the heavy and transport machinery industry is indissolubly connected with acceleration of scientific and technical progress. Currently the production of improved equipment for steelmaking by the oxygen converter method with in-furnace degassing is being expanded. Since the beginning of the five-year plan the production of 38 new types of equipment for mechanizing hoisting and transport, loading and unloading, and warehousing work has been organized, while another nine models are currently in the testing stage.

All this can be put down to the credit of the aktiv of Mintyazhmash. But there are also shortcomings in the implementation of technical progress. In the first half of the current year, the ministry did not completely fulfill its plan for new equipment. Schedules for the production of the first industrial series of new equipment were breached, and 14 assignments for the incorporation of advanced processes and mechanization and automation of production have remained unrealized. In particular the Donetskgorasmash [mining machinery] production association (general director V. Osmerik) has delayed manufacture of an equipment complex for mines with sharply sloping coal seams.

Party and state decisions on improving the economic mechanism call for the development of special comprehensive scientific-technical, economic and social programs as an important component of state long-range plans. Taking an active part in this work, the ministry has decided to prepare for the addition of seven more programs to the existing eight comprehensive scientific and technical programs sectorwide by 1 April 1980. These include programs for organizing and increasing the production of self-propelled mining equipment and opencut excavators, for the development and putting into production of metallurgical equipment for the production of high-quality steel with coatings, for the development and putting into production of railcars, diesels and tracklaying machinery for the Baykal-Amur Railway, and for decreasing manual labor in the sector's associations and enterprises.

The workers in the heavy and transport machine building industry are currently critically analyzing the results of work during the first three quarters of 1979 and are locating additional latent potential in order to overfulfill the annual assignments for increases in labor productivity, profit, and product sales, and to prepare themselves comprehensively to begin 1980.

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